

THE IRON AGE

A Review of the Hardware, Iron, Machinery and Metal Trades.

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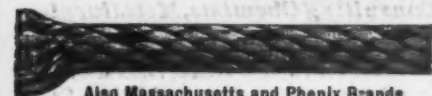
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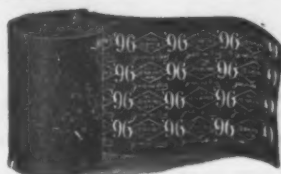
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THE IRON AGE

New York, Thursday, January 31, 1907.

The Hartness Turret Chasing Tool

A new attachment for use on the Hartness flat turret lathe, made by the Jones and Lamson Machine Company, Springfield, Vt., is an automatic turret screw chasing tool herewith illustrated. The tool is intended for cutting screw threads on chuck work, and may also be used for turning short tapers. Screws of every diameter from the 12 or 14 in. swing of the lathe down to $2\frac{1}{4}$ in. in diameter for internal and about 1 in. for external screws, and any length under 5 in. are within its capacity. Before describing this attachment in detail mention will be briefly made of the various schemes heretofore used for producing screw threads by chasing.

The first improvement over hand chasing was chasing in an engine lathe, an all round or universal method, but one having disadvantages. It employs a long screw that

developed to be used with the Hartness cross sliding head lathe. Although at present restricted to use on the Hartness machines the scheme is one that could be readily adapted to any form of lathe.

Referring to the accompanying engravings, the operation of the device, which is extremely simple, may be easily understood. It is a compact tool and is rigidly bolted to the top of the turret. Fig. 1 shows the attachment applied to a Hartness flat turret lathe. In Fig. 2 the device is shown by itself for better clearness, and the construction and operation are brought out in the line drawing, Fig. 3. In use the turret carriage is brought forward until the main casting *a* of the turret chasing tool comes as close to the work as convenient. The turret carriage is then clamped, and the cutter is caused to travel back and forth by its own mechanism, which receives its motion from the main spindle through bevel and tangent gears and an overhead rod. The

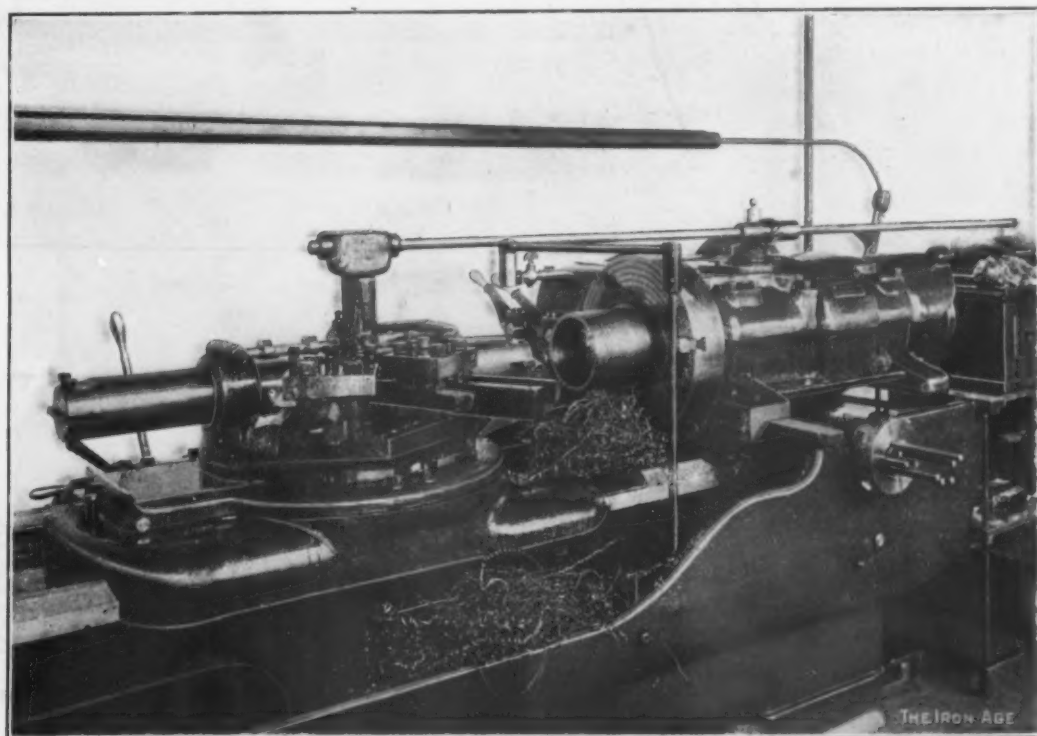


Fig. 1.—The Automatic Screw Chasing Attachment Applied to a Hartness Flat Turret Lathe, as Made by the Jones & Lamson Machine Company, Springfield, Vt.

invariably wears most in one spot on the average work. There are many unnecessary joints between the spindle and the tool, both sliding and rotary, the lost motion in which results in a large thread at both ends of the screw—where the tool begins to cut and where it runs off. It is reasonable to expect that the screw also will not be true between the ends, because of irregularity in the tool's action, due either to the peculiarities of the mechanism controlling its progress, or to the varying hardness of the work.

The disadvantages of this method were largely overcome in the Fox lathe chasing apparatus, a device much quicker in action, although restricted to short threads. The weaknesses of the Fox chasing bar were such, however, that it was confined almost wholly to work on the softer metals. In the eighties and early nineties the Jones & Lamson Company attempted to use this scheme for some of the harder metals, but it was the final conclusion that the chasing bar device is not stiff enough to control the tool. The present device is limited to the same class of work covered by the Fox chasing bar, and has been

sliding bar *b*, which is 2 in. in diameter and carries the cutter *c*, also carries a segment of a nut, *d*, which is thrown in and out of contact with the small lead screw *e* by the rod *f*. This rod has a cam surface directly under the nut *d*, so that its partial rotation causes the nut to engage or disengage the thread. This same partial rotation causes the cutter to be presented to or detracted from the work by the action of the crank pin *g*. The rod *f* may be actuated by the handle *h* or by the collars *i* and *j*, provided with face pins which may be alternately driven down against the rod *f* to effect its partial rotation. The collars *i* and *j* are set according to the length of the thread, which at the maximum may be 4 in. When all of the settings are made the work is done automatically, the operator's only duty being to regulate the depth of cut by feeding the cross sliding head.

The quick return of the cutter bar is accomplished by the gear *k*, which is driven by a spring friction and maintains a retarding effect on the cutter as it advances, and the instant the nut is withdrawn this pinion *k* has sufficient force to retract the cutter bar. The cutter

bar comes back until the pin *l* strikes the collar *j*, and it rests against the face until the pin in collar, *j*, comes around and pushes pin, *l*, down again. The forward motion of the cutter is arrested automatically by the pin *m* striking the collar *i*.

The cutters may be of the chaser form or a single-edge cutter, according to the character of the work, but if of the chaser form they must have ample clearance so as not to affect the natural lead of the lead screw. Right and left hand threads are cut by simply reversing the swivel head *n*, so that the bevel gear on the horizontal shaft is on the opposite side of the one on the vertical

used in connection with the threading device, and a sample of work which must be accurately produced. A glance will show that the tools are accurately held and firmly presented to the work.

Incidentally this illustration gives a view of the swivelling chuck jaw which is often necessary and always desirable in turret lathe work to firmly grip the work. Frequently the output of a machine is limited by the frailness of the work because a four-jawed chuck generally tends to flatten one way more than another, but even if it were possible to get an equal pinch on each pair of jaws there would still be a tendency to squeeze the piece

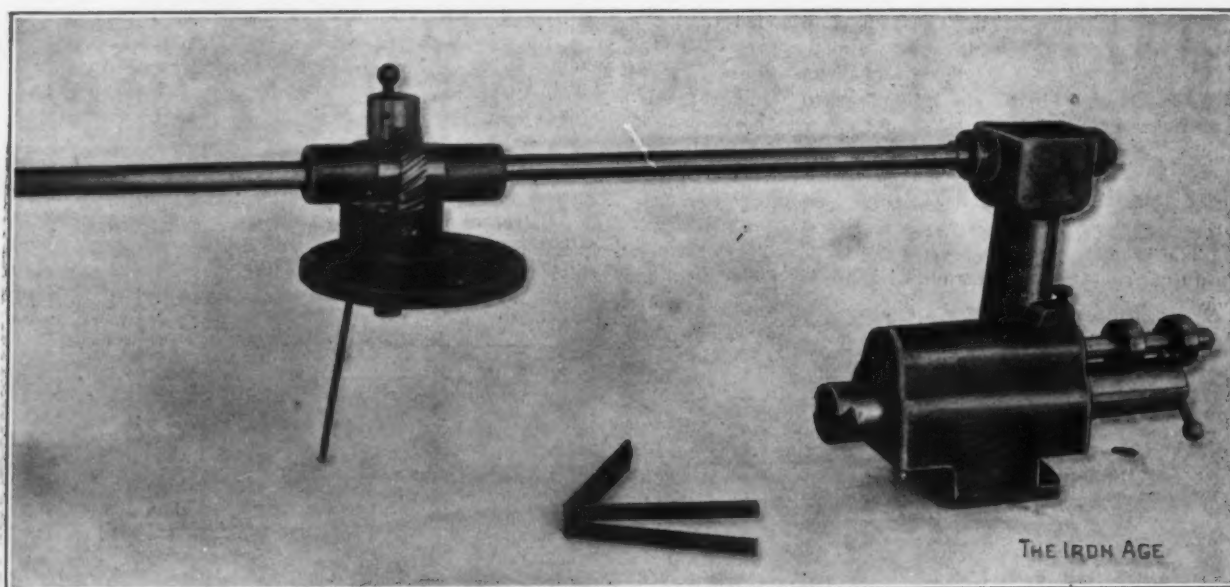


Fig. 2.—The Parts of the Turret Screw Chasing Attachment by Themselves.

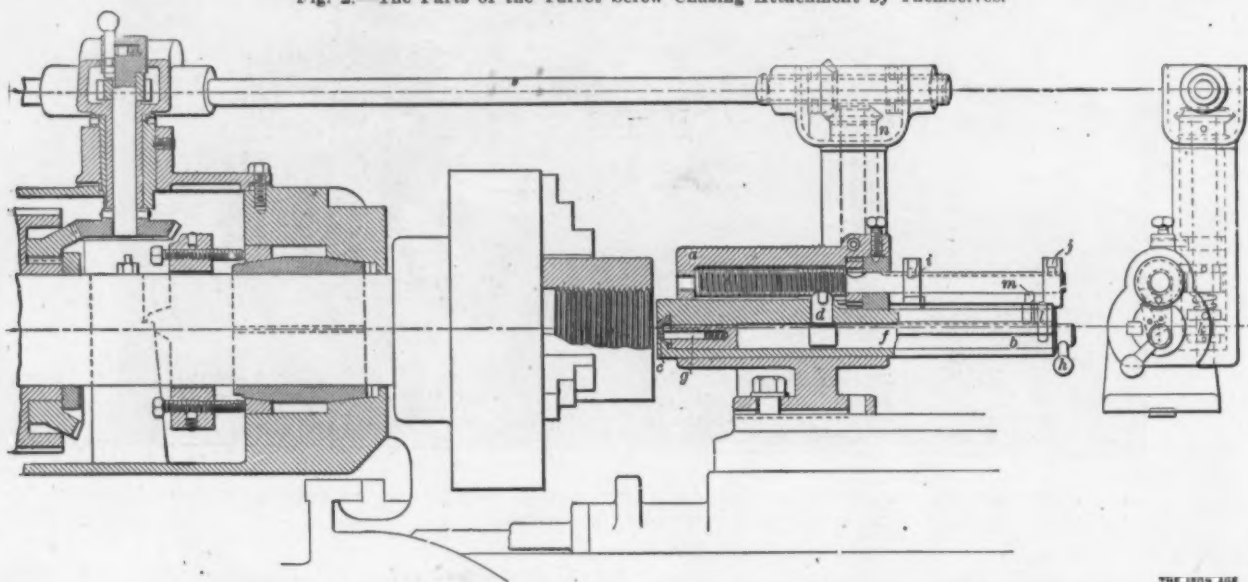


Fig. 3.—Sectional Elevation, Showing the Drive and Construction of the Turret Screw Chasing Tool.

shaft. An extra lead screw and nut is required for each different screw pitch cut, but one set answers for any diameter.

This tool is not part of the regular equipment of the flat turret lathe, but may be added to any machine recently shipped. Its importance becomes apparent when it is considered that there is still done in engine lathes chucking work that could be done much cheaper in turret lathes, if the latter had any satisfactory way of producing large, short threads true with the other cuts. This attachment makes it possible to turn out all such work.

In the view of a machine in which the chasing tool is being used, given in Fig. 1, other tools wholly obscure the view of the main features of the chasing tool, but other important elements of interest are brought out. For example, the means for holding the other tools that are

into square sides. A three-jawed chuck gives an equal distribution of pressure to each jaw, but it has the disadvantage of fewer points of contact on the ring, and, of course, a greater tendency to squeeze it out of shape. By the use of these swivel jaws advantage is taken of the three-jaw principle of equal pressure, and then, by exerting the pressure of each jaw through two points by a swivel yoke, the holding force is distributed around at six practically equidistant points so that a great pressure can be brought on the work without appreciably distorting it.

The steamer Thomas F. Cole, one of the four 600-ft. boats the Pittsburgh Steamship Company has under contract at lake shipyards, was launched on Saturday, January 26, by the Great Lakes Engineering Works, Detroit.

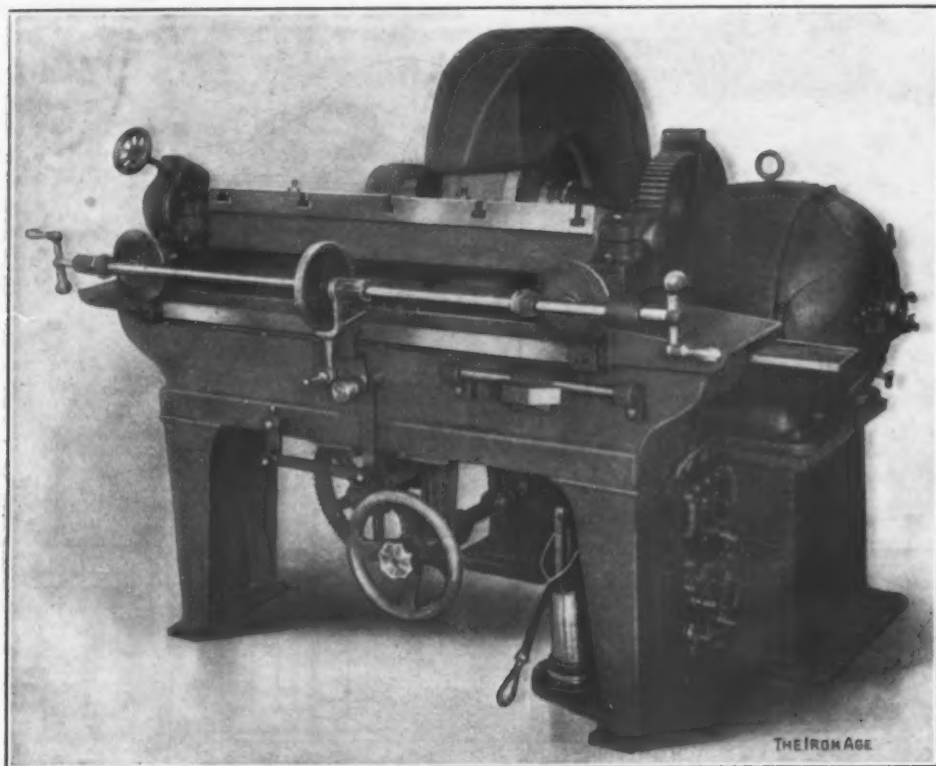
A Bridgeport Motor Driven Knife Grinder.

An improved medium weight knife grinder for grinding knives used on planing machines, trimming presses, paper machines, bark machines, leather splitting machines, tobacco cutters, &c., is a recent product of the Bridgeport Safety Emery Wheel Company, Bridgeport, Conn. It is made in four sizes, for grinding lengths up to 32, 42, 52 and 62 in., respectively, with contained motor drive as in the illustration, or with pulley for belt drive. All have $1\frac{1}{2} \times 26$ in. wheels with 12-in. holes. To prevent heating and drawing the temper of the work it is arranged to use water, and as this also keeps the wheel from becoming glazed, the latter cuts faster and the grinding is more quickly accomplished. The loose emery dust, being wet by the water, cannot float about in the air and find its way into the working parts, consequently the machine will last much longer.

The automatic cross feed is regulated by a thumb

the carriage can be traversed by the hand wheel to adjust the knife to position without stopping the wheel or any of the belts. Screwing up the hand nut engages the friction and starts the automatic carriage motion. The carriage runs on a wide flat track, its outer edges being yoked under the bed to hold it securely in alignment, and is gibbed to take up wear. The knife is thus held securely in correct position, and the knife bar and carriage cannot be lifted off the ways by excessive pressure of the wheel against the knife in grinding. The carriage completely covers the surfaces of the bed on which it slides, protecting them from particles of dust and emery. By means of adjustable dogs the machine can be set to grind knives of any length up to its capacity.

The emery wheel is mounted on a rear extension having a box leg under its outer end, and when partly worn out can be set forward to use the balance. The wheel has a $1\frac{1}{2}$ -in. spindle running in self-oiling bearings 7 in. long. The back extension, besides being a very stiff sup-



An Improved Motor-Driven Knife Grinder Built by the Bridgeport Safety Emery Wheel Company.

screw and can be adjusted so finely that it grinds the seven-thousandth part of an inch at each traverse of the carriage. It will stop feeding and grinding at any point, hence, when properly adjusted and set in motion no attendant is required. Both ends of the knife are fed forward equally at the same time, at the end of the stroke as the carriage motion reverses. A graduated dial at the end of the knife bar facilitates setting the knife quickly, so as to grind it to the same degree or bevel that it originally had.

The knife bar is very stiff, being hollow and of large square cross section, so that long knives can be drawn down to it firmly by bolts, taking out the wind and spring caused by tempering. These bolts are easily inserted, as they go up through the bar and knife from the under side. The knife bar being arranged to swivel at each end, if, after bolting on a knife and traversing it in front of the wheel it is found that one end is nearer the wheel than the other one of the bevel feed gears may be slipped out of mesh and the other end operated until the bar is in the right position to grind an equal amount from both ends of the knife.

The carriage motion is driven through strong back gears, all cut from the solid. A large hand wheel on the front of the machine with a hand nut at its center controls the friction gear. When the friction is thrown out

port for the wheel, forms a double water compartment. The water in the lower tank is forced into the upper tank and under the wheel by air pressure furnished by a hand pump. The hood covering the wheel is arranged on the inside to catch the water and spray and conduct it back to the base below. Narrow cast iron pans on the back side of the bed catch the drip from the knife bar and carriage and conduct it back to the reservoir. Through a $1\frac{1}{4}$ -in. outlet pipe at the back of the machine the water can be drawn off when necessary to clean out the sediment.

A bracket bolted to the side of the machine and supported by a square base makes a solid foundation for the motor. The motor is back geared to the emery wheel shaft, 2 to 1, by a cut gear and pinion, giving the emery wheel a speed of 300 rev. per min. The gears are protected by a cast iron hood, opened in the illustration to show the gear. The placing of the gears allows the wheel to be moved forward as it wears down without changing the position of the motor.

It is stated that a French syndicate has obtained a contract to supply rolling stock for the Government railroads of Russia for a term of years, and that it intends to construct car and locomotive shops at Dikitorva, Russia.

The Heroult Electric Steel Process in Practice.

At the annual meeting of the Verein Deutscher Eisenhüttenleute at Duesseldorf, Germany, Professor Eichhoff, of the School of Mines at Charlottenburg, near Berlin, read a paper on "Progress in the Manufacture of Electrical Steel." Professor Eichhoff, who was a steel maker until recently, when he accepted the professorship at Charlottenburg, was identified with the introduction and development of the Héroult process at Remscheid. While he reviews in a general way the progress made in the application of electricity to steel making, and describes and criticises the Gin, Ferranti, Kjellin and Stassano furnaces, the most directly interesting part of his paper is that which relates to the Héroult furnace and process.

Special Economical Conditions Necessary.

Dr. Eichhoff does not believe that the manufacture of pig iron can be cheapened by the electrical process, as

facture may be instanced of electrodes which are soon to be employed 16 ft. long and 3 ft. in diameter. Often there are years of delay in carrying out new processes or otherwise good inventions. Thus it is the construction of the apparatus, in which Héroult desires to carry out his pig iron process, which is the only difficulty in the utilization of the process on a large scale. Electrical manufacture of pig iron will probably develop in the near future in Canada, in Brazil, in the East Indian Archipelago, and in New Zealand. It is likely that the electric process of iron manufacture from the ore may, on account of the high temperatures attainable, permit the production of a raw iron, but a pig iron which possibly may not contain much above 1 per cent. of carbon and which poured in a liquid state into an electric furnace may prove a better raw material than the pig iron as now made. It is, of course, a very different matter, when it is a question of making a special iron or ferro alloy. Electrically smelted ferrochrome, ferrotungsten, ferrosilicon, &c., are so well known that no further reference need be made to them. The property of the electric

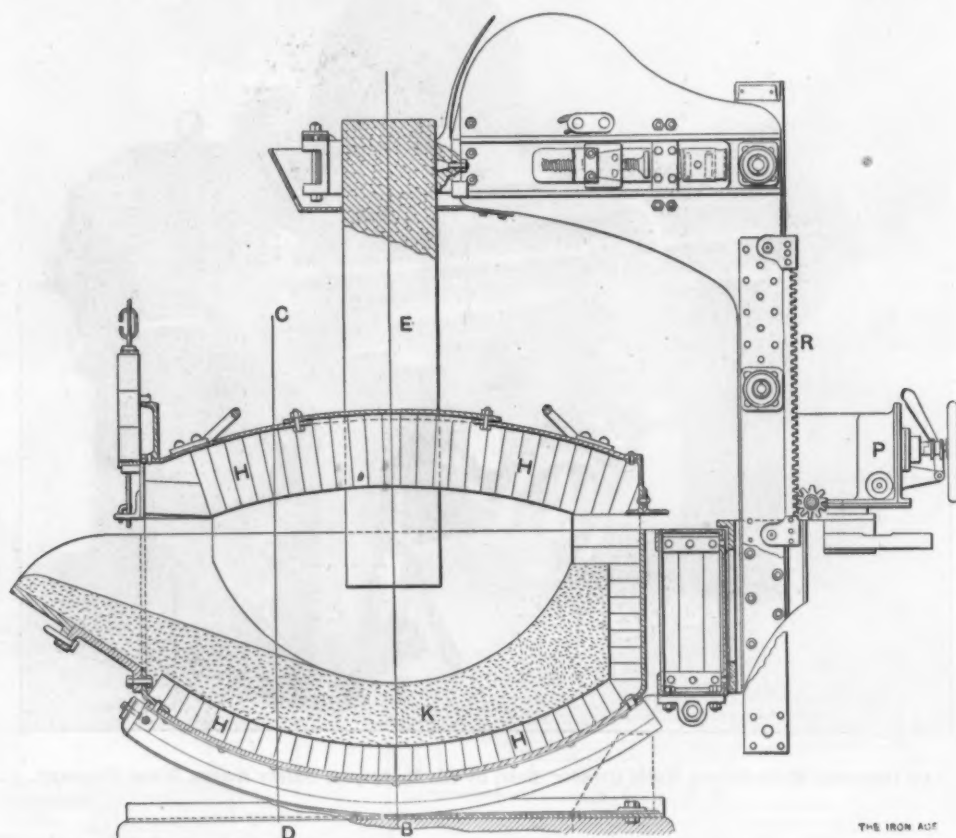


Fig. 1.—Vertical Section through the Héroult Electric Furnace.

compared with smelting in the blast furnace, when the electricity must be generated by burning coal. So far as the utilization of water power is concerned, costs have not thus far not been reached in Western Europe which would permit of competition with the blast furnace even with adverse freights. It is only in special cases in which good, rich ores in close proximity to water power are available; in which the price of coke exceeds 30 marks per ton; in which cheap labor is coupled with high freights on competing pig iron or duties on the latter render importation difficult, that the electrical method of manufacturing may be employed. Such conditions prevail in a larger number of cases than is generally believed. Thus tests have been made in Canada which have led to good results. The chemical and metallurgical principles have been established, but before the method has developed into manufacture on a large scale considerable time will elapse and a good deal of experience as to construction must be gathered.

It is not an easy matter to build an apparatus for such a process since, simple as it may seem, it is a serious question how to overcome the difficulties which arise with different parts of the construction. The manu-

furnace to produce pure metals plays an important part in this branch of manufacture.

Cost of Steel Making Cheapened by Electric Furnaces.

At the present time there can be no question of cheapening costs in the manufacture of steel for merchant products, like shapes, bars, &c., in those industrial centers where no water power is available and where electricity is produced from coal. In the largest furnaces thus far built for 5-ton charges, a power consumption of 870 to 752 kw.-hr. is necessary, starting with cold scrap. If the raw material is melted in the usual open hearth furnaces or Bessemer converters, and is transferred in a liquid condition and overblown, into the electric furnace, the consumption will, in such a small furnace be from 200 to 300 kw.-hr., according to the purity of the product required. With a larger furnace this will be considerably lowered. A 1.5-ton furnace, for instance, requires 2 hr. to purify and complete a molten charge of unpurified material. In order to heat this quantity by 200 degrees Celsius there will be required $0.4 \times 200 \times 1500$ equals 120,000 calories equals 260 kw., equal to 130 kw. per hour. In practice

250 kw. are on an average required. In other words, 48 per cent. of the energy is lost by radiation.

The capacity of an electric furnace may be readily increased to 10 tons without correspondingly increasing losses by radiation. Since the surface of a 10-ton furnace is twice that of a 1.5-ton furnace, the consumption of power, if it is to finish a heat in 2 hr., will be 163 kw.-hr. per ton of steel. This may be reduced to 130 kw.-hr. per ton for grades of steel which do not need so thorough a purification. Under such conditions the case of the electric current is not so great as to be prohibitory. When it is considered that a Héroult furnace, for instance, requires little or no ferromanganese, but that the manganese is reduced directly from additions of ore, that only the theoretically necessary addition of ferrosilicon need be charged and that raw materials, lower in grade and cheaper may be used, then the point is reached when the costs of the new and the old methods approach one another closely. The difference is counterbalanced by the higher quality.

The whole question assumes a different aspect as soon

manganese and silicon, may absorb large quantities of oxygen-iron compounds, the quantity increasing with the temperature. The existence side by side of carbon and oxygen-iron compounds can only be explained by the absence of a reaction between them at high temperatures. This assumption then explains the phenomena which occur when steel cools. Assuming that the steel is cast at a temperature of 1750 degrees Celsius, and that at that temperature it has a capacity for dissolving 2 per cent. of the oxygen-iron compound, but does not contain more than 1 per cent., which corresponds to a temperature of 1650 degrees. When the steel has reached the latter temperature the segregation of the oxygen-iron compound begins, the reaction between it and the carbon starts and the steel becomes agitated. To avoid blowholes, therefore, the solution of oxygen-iron compounds must be prevented, and when formed must be destroyed. Hitherto this has been accomplished by manganese and silicon, which has the disadvantage that the oxides of these substances are solids which remain in the steel in a finely divided state, in a sort of "emulsion." If this is to be

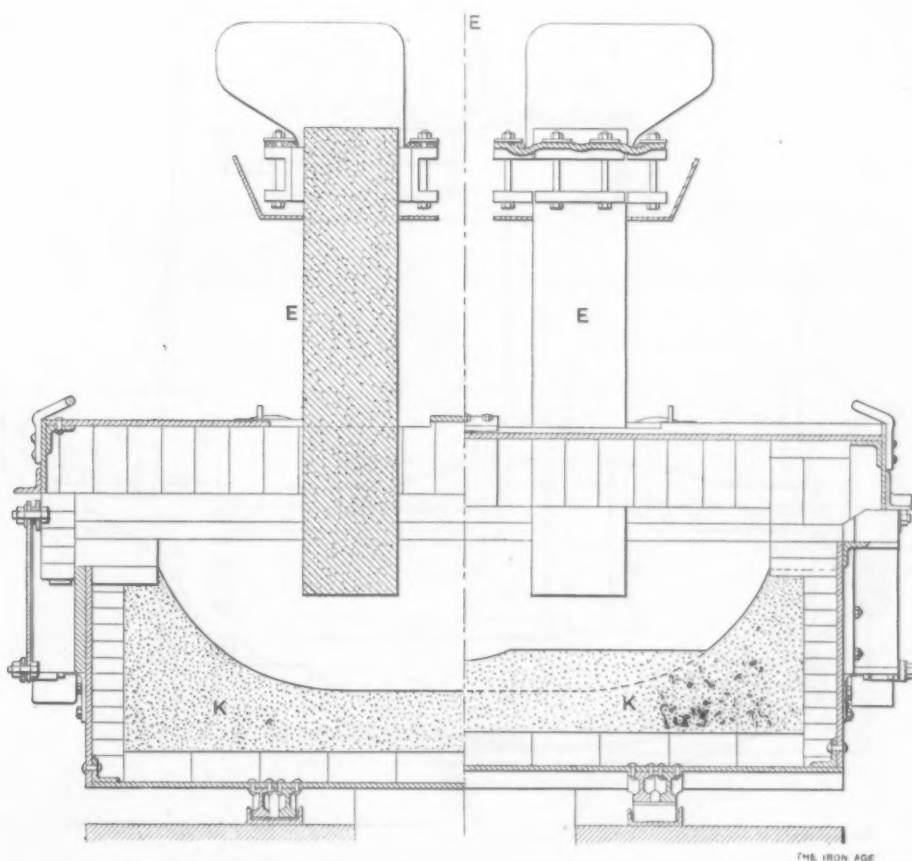


Fig. 2.—Cross Section through the Héroult Electric Furnace.

as the high grade steels are involved. The Héroult process is independent of the quality of the raw material and is therefore cheaper than all other methods thus far known which call for the use of selected purified or imported raw materials, provided that a really high degree of purity is required in the finished product.

The Quality of the Steel.

As to the question of the quality of electrically produced steel, two points deserve consideration, that of deoxidation and that of chemical purity. All current methods of steel making, except possibly the crucible steel process, are based upon means for deoxidization. Even thoroughly deoxidized steel must contain certain percentages of readily oxidized elements, like manganese, in order to be protected against oxidation during the act of casting. Dr. Elchhoff holds that the boiling of steel and the formation of blowholes and cavities are due to the presence in the steel of dissolved compounds of oxygen and iron, the quantity being dependent upon the temperature of the metal. Now it has been shown that at the high temperatures attainable in the electric furnace even high carbon steels, provided they are free from

prevented the deoxidation must be effected with substances whose oxides are gaseous, like carbon, or the other substances, like oxide of manganese, must be given time to separate.

It is known, however, that every basic slag of any iron producing process holds in solution compounds of iron and oxygen, and that these are decomposed to protoxide of iron by metallic iron, which is dissolved in the latter, even when it has been deoxidized. A thorough deoxidation is not, therefore, attainable, unless the slag has been successfully freed from iron. This is what the Héroult furnace accomplishes.

Dr. Elchhoff answers in the affirmative the question whether the electric process makes it possible to produce a purer steel, or permits the use of impure material to produce as pure or a purer steel than hitherto made. This applies, however, only to those elements like phosphorus, sulphur, manganese and silicon, which can be oxidized, while copper, nickel, arsenic, &c., cannot be removed. At the first glance this does not appear to be anything new, but the new fact is that phosphorus can be brought down to 0.003 per cent. and sulphur down

below 0.01 per cent., independently of the contents of the raw material. By the elimination of these substances the injurious effect of copper and arsenic is avoided, because it is not these elements themselves, but their sulphur compounds which have a deleterious effect upon the steel. So thorough a purification calls for vigorous oxidation, which until now could not be effected, because there were no means of again getting rid of such exaggerated oxidation.

The Furnace.

The Héroult tilting furnace consists of a plate shell lined with refractory brick, H, and dolomite, K, as shown in Figs. 1 and 2. The bottom is rounded and is provided with two bent rails, which move in channels. The roof of the furnace is removable. At the back of the furnace are two electric motors, P, Figs. 1, 3 and 4, which through rack and pinion operate the arm R, to which the electrodes E, Figs. 1, 2, 3 and 4, are attached. Their position with reference to the bath is so regulated that a distance of about 45 mm. above it is maintained. A possi-

ble carburizing of the bath is thus avoided. When the slag has become quite white a sample of the steel is taken and its carbon content is determined. Then a mixture of iron and carbon, accurately calculated, is added, and, when dissolved, the necessary addition of manganese and of ferrosilicon is charged to produce the desired quality. The steel is then tapped.

So far as phosphorus is concerned the analysis of the steel in a well managed charge fluctuates between 0.003 and 0.005 per cent., while sulphur ranges from 0.007 to 0.012 per cent. As a rule, carbon, manganese and silicon can be accurately kept within limits of 0.03 to 0.05 per cent. The results obtained in desulphurizing are of the greatest interest. The elimination of the sulphur takes place during the last stage of the process, and, according to Dr. Eichhoff, appears to be due to the fact that the slag can be kept much more basic than is possible in any other process. When the steel is taken in a highly oxidized condition from the Wellman furnace it carries only about 0.01 per cent. of phosphorus, and may be directly covered with carbon and the neutral slag. This makes it

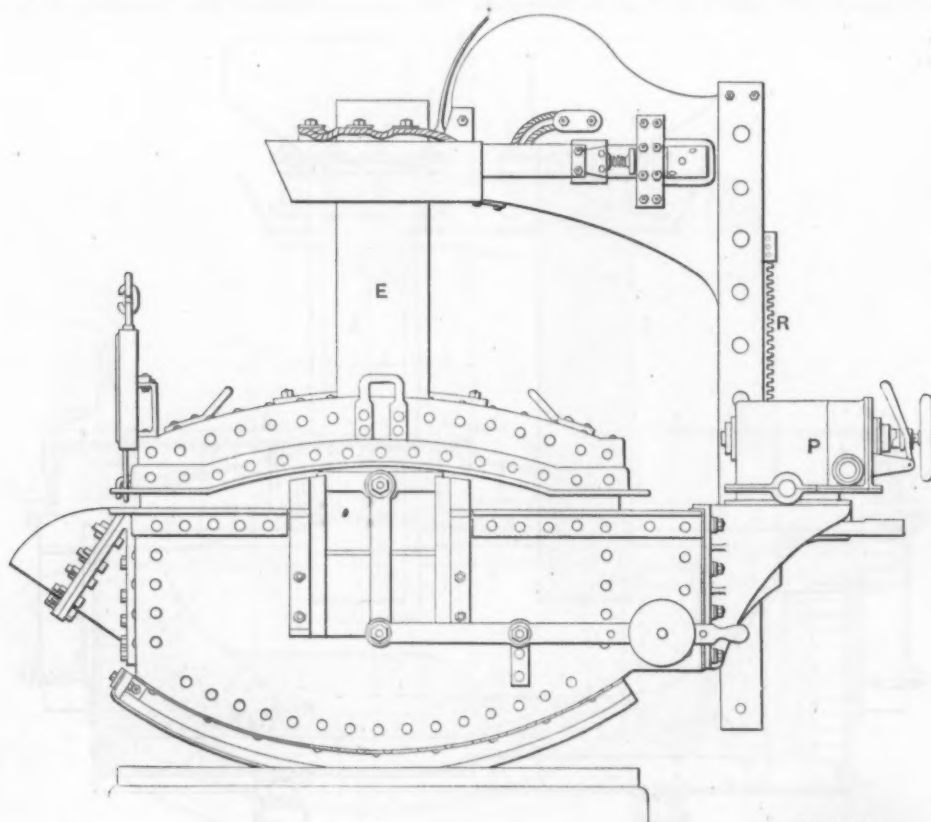


Fig. 3.—Side Elevation of the Héroult Electric Furnace.

ble carburizing of the bath is thus avoided. So far as the author knows breakage or splintering of the electrodes has only happened a few times in the course of about 1000 charges. The operation of the heat was only influenced once, and then the charge was not spoiled.

The process is carried through as follows: From a Wellman tilting open hearth furnace 1.5 to 2 tons of liquid steel, partially purified, is cast into the electric furnace, care being taken to hold back the slag. The bath is covered with an oxidizing slag, and the current is turned on. After the lapse of one-half to three-quarters of an hour the slag is carefully drawn off, the clear bath is covered with a certain amount of carbon and a fresh amount of slag, free from oxides, is charged. This slag is melted after 20 min., and then through the action of the arc upon the slag, it is thoroughly deoxidized, calcium carbide being formed. In this manner the bath is completely protected against access of air. The charging of the neutral slag cools the bath so much that the greater part of the protoxide of iron is reduced by the layer of carbon. A certain quantity of manganese ore is also charged with the neutral slag. This, too, is reduced and destroys the last small balance of the protoxide of

possible to finish a charge in 1¼ hr., with a consumption of power of 200 kw.-hr. per ton of steel.

The high temperature of the arc is regarded as the reason why extreme purification and deoxidation are possible. The fear that this high temperature might injure the steel has not been justified by the events. The circulation in the bath is always active, and its individual parts are only exposed to it for a very short time. The average temperature of the bath need not be kept higher than in any other furnace. This active circulation leads to the circumstance that during the period of oxidation all parts of the bath come into contact rapidly with the slag, which is rendered particularly active by the high heat, and that the purification proceeds very rapidly. Similar causes bring about a rapid working of the process in its later stages. The high temperature, too, seems to affect with particular energy the alloying of the steel.

Dr. Eichhoff quotes a long table of analyses of consecutive charges, which show, too, how closely the analysis aimed at has been attained.

The plant at Remscheid was started on February 17, 1906. Since March 22 the firm of Richard Lindenberg has made nothing but electrical steel, the demand for

which has been so urgent that it has become necessary to double the plant. A new 1400-hp. equipment, a second furnace and a large rolling mill have been ordered. The electric plant has not called for a single day's stoppage for repairs, but the primary Wellman furnace has caused delays which experience has taught how to avoid in the future. The electric furnace is working with the hearth originally put in. The roof, which consists of only a small layer of brick, lasts over 100 charges. The electrodes last for 70 to 80 hr.—a consumption of 1 cm. per hour. The average power requirements are about 250 kw., or 385 kw.-hr. per ton of steel.

Comparisons with Crucible Steel.

Dr. Eichhoff quotes the results published by L. Guillet of Paris, and reaches the following conclusions, comparing the Héroult steel with the best crucible steel:

1. With equal toughness it permits of a carbon content from 20 to 40 per cent. higher, and therefore has a greater resistance to wear.

Steel produced may be kept for hours under a neutral slag without changing its quality, and a part of the heat may be cast and the balance be worked over to another grade—a matter which is of great importance to steel foundries. The steel may be allowed to chill and be melted over again without hurting its quality.

Cost of Production.

The cost of production varies greatly according to conditions and the quality of the raw material. Dr. Eichhoff has compiled the following table of the time required for the different operations, assuming the impurest raw material and the highest purity of product, taking a series of weights of charges.

Time Required for Operations, in Minutes.

Weight of charge, kilos.	500	1,000	1,500	2,000	3,000	5,000
1. Repairs of hearth, cold charge	10	14	16	18	20	22
2. Repairs of hearth, hot charge	8	10	12	14	17	20
3. Charging, cold charge.	12	15	18	21	25	30

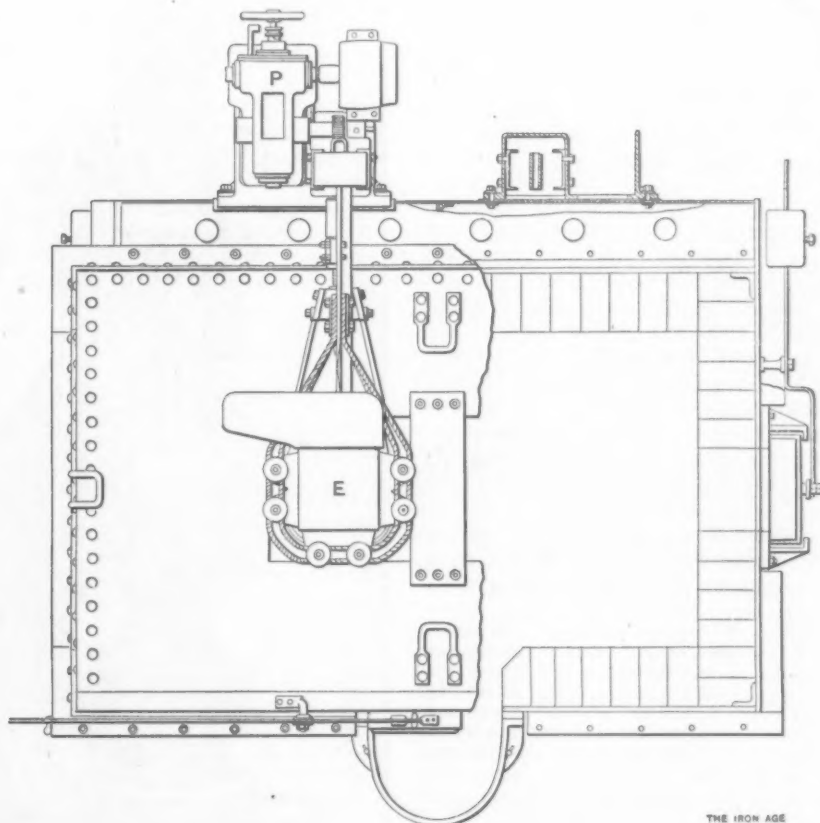


Fig. 4.—Top View of the Héroult Electric Furnace.

2. It has a strikingly high elastic limit and contraction of area.
3. It is completely free from blow holes and therefore, when the process has been properly conducted, no surface defects or longitudinal cracks appear.
4. That it is completely deoxidized and contains no "emulsion" of silica or manganous oxide.
5. That the presence of copper and arsenic has no injurious effect, so long as practically no sulphur is present.
6. That segregations of phosphorus and sulphur do not occur.
7. That it forges better and stands a higher heat better than crucible steel.
8. That the cost of production is far below that of crucible steel.
9. That it is independent of the quality of the raw material.
10. That its manufacture is coupled with less exertion for the workmen than that of crucible steel.
11. That in purity it excels nearly all crucible steels.
12. That the process makes it possible to produce any kind of alloy steels, even such whose analysis has been thought to be impossible hitherto.

4. Charging, hot charge.	15	15	15	15	15	15
5. Melting charge, cold charge	100	135	170	180	200	238
6. Drawing off first slag, cold charge.....	7	9	11	12	14	15
7. Melting slag, cold charge	17	14	16	17	19	20
8. Melting slag, hot charge	27	30	34	36	40	44
9. Drawing off second slag, cold or hot charge	7	9	11	12	14	15
10. Melting slag, cold or hot charge.....	12	14	16	17	19	20
11. Drawing off third slag, cold or hot charge..	12	13	14	15	17	20
12. Melting slag, cold or hot charge.....	18	20	22	24	28	30
13. Melting slag, hot charge	30	35	40	42	46	55
14. Converting slag to white slag.....	15	15	16	17	19	20
15. Smelting carbide.....	30	35	40	40	40	40
16. Smelting additions....	5	8	10	10	10	10

With liquid metal charged the total time required and the consumption of power are as follows, for different weights of charges and for different repetitions of making and drawing off slag:

Time and Consumption of Power, Charging Liquid.

Weight of charges.	dyna- mo.	Average con- sump- tion in Kilo- watts.	Time. Hours.	Drawing slag twice. Kilowatt- hours per ton steel.	Time. Hours.	Drawing slag once. Kilowatt- hours per ton steel.	Without drawing slag. Kilowatt- hours per ton steel.
500	218	175	2.00	700	1.68	588	1.33
1,000	265	215	2.29	493	1.91	410	1.55
1,500	312	250	2.60	433	2.15	357	1.78
2,000	362	290	2.73	396	2.24	325	1.82
3,000	456	365	2.97	360	2.42	294	1.92
5,000	643	515	3.15	324	2.57	265	2.08

These data will permit of figuring the cost, so far as power and time are involved. The operation of a furnace calls for two men and a boy. When cold material is charged one or two chargers are required, according to the size of the furnace. The consumption of electrodes ranges, according to the size of the furnace, between 4 and 3 marks with a cold charge and 2.5 to 1 mark with liquid metal. The waste, with the purest product, is 6 per cent. in cold charging and 3 to 2½ per cent. with liquid metal. The consumption of lime and of ore is not larger than with other processes. There is an important saving in ferromanganese and ferrosilicon. The cost of repairs and the consumption of refractories are much less than in an open hearth furnace.

Trade With Cuba.

Exports from the United States to Cuba in the calendar year 1906 were larger than in any other year of our trade with that island. Imports from the island fell \$10,000,000 below those of the high record year, 1905, this fall being due to a reduction in prices of sugar, of which the quantity imported in 1906 was greater than in any earlier year. The total value of exports to Cuba in 1906, as shown by figures just compiled by the Bureau of Statistics of the Department of Commerce and Labor, was \$46,491,944, against \$44,569,812 in 1905. Of these exports iron and steel and manufactures thereof amounted to about \$8,500,000 in 1906, a gain of about \$500,000 over 1905.

The table which follows shows the total value of imports into the United States from and of exports from the United States to Cuba in each calendar year from 1900 to 1906:

	Imports.	Exports.
1900.....	\$31,747,229	\$26,934,524
1901.....	46,663,796	27,007,024
1902.....	48,619,588	23,061,623
1903.....	57,228,291	23,504,417
1904.....	74,950,992	32,644,345
1905.....	95,857,856	44,569,812
1906.....	85,055,295	46,491,944

The official figures of the Cuban Government show that the United States in 1905 supplied 45 1-3 per cent. of the total imports of Cuba and took 86½ per cent. of the total exports of that island.

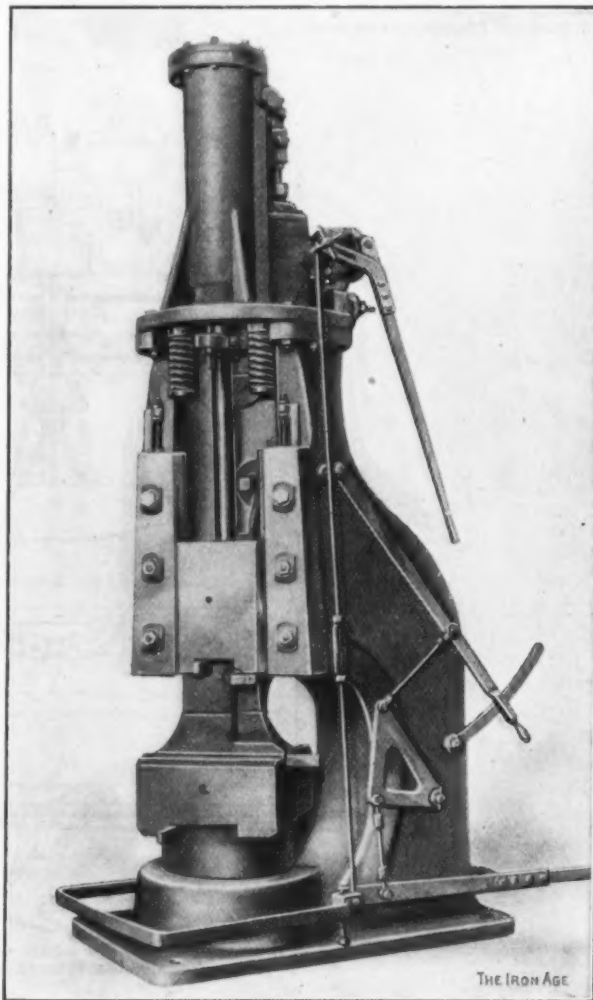
An Improved Bell Steam Hammer.

The hammer illustrated was designed and built by the David Bell Engineering Works, Buffalo, N. Y., especially for drawing down the bed part of axles used for buggy, coach and heavy truck vehicles. It can be used on many different kinds of work requiring similar treatment and is capable of handling up to 4-in. round or square steel bars. The distinctive feature is that the face of the lower die comes within 6 in. of the bottom of the slides, which 6 in. is equivalent to the thickness of the upper die, and this leaves the ram or hammer head entirely within the guides its entire length when work is done down on the dies. The purpose in making this space so short was to be able to use one end of the die for a length of 4 in. for drawing down the stock with a narrow faced surface, and the other end of the same die face, which measures 8 x 9 in., for finishing the axle. It was very desirable to obtain the maximum efficiency from the blow on this class of work; to do this the weight of the lower die block was very materially increased over standard design (5 tons where it was formerly 3 tons), because the efficiency of

a steam hammer depends almost entirely upon how quick the hammer is stopped.

The die block consists of a very large, heavy, square cast iron base, bedded down into the foundation of the hammer, and into this is keyed an iron forging 20½ in. in diameter, which was turned to fit the hole bored in the frame of the hammer with only a very small clearance. On the top of the round iron part is keyed a large, square anvil cap, made of hammered steel, as changing the dies makes it necessary to frequently drive the bolts in and out which hold the lower die. Other dies furnished are cut to suit round, square, octagon or other shapes for finally finishing axles.

The foot treadle shown connects with the throttle valve lever, admitting steam to the hammer, and the main lever which gives the necessary variation in the force or position of the blow, and may be adjusted to reg-



An Improved Steam Hammer Built by the David Bell Engineering Works, Buffalo, N. Y.

ulate the number of strokes per minute. In other words, the relative connections of the main and throttle levers may be varied to obtain any result possible if the levers were handled by another operator. The advantage in this is that the man handling the work knows better exactly what blow is required, and, with this arrangement, can obtain it.

The hammer is similar to the Bell standard guide steam hammer, having an 850-lb. falling weight, although the total weight of this machine is about 21,000 lb. instead of 13,500 lb. The hammer is also built with reinforced guides and stiffened column as now employed on all of the company's standard hammers. This construction, described in *The Iron Age* May 10, 1906, gives a great excess of strength at the bottom of the slide faces of the main frame casting, where practically all of the strain comes on a hammer of this type. The valve motion and control, outside of the treadle feature, remains practically unchanged and is very sensitive.

Bounties for Canadian Shipbuilders.

The Norwegian Monopoly of the Coal and Ore Carrying Business of Nova Scotia.

OTTAWA, January 26, 1907.—Just at the time when a ship subsidy bill is hanging in the balance at Washington, Canadian shipbuilders are impatiently awaiting the decision of their Government with regard to their appeal for tonnage bounties as a means of upbuilding the Canadian merchant marine. The appeal for bounties was strongly pressed on the Laurier Government when the Canadian Tariff Commissioners—Messrs. Fielding, Paterson and Brodeur—were on the Pacific Coast and in the maritime provinces. It was expected that some announcement of the Government's policy in regard to the matter would be made when the new tariff was introduced in the House of Commons on November 29. It was then announced that the bounties on pig iron and steel ingots were to be continued to the end of 1910; but no statement was forthcoming as to the intention of the Government as to bounties for shipbuilding.

Even yet there has been no clear and direct statement of the course the Government will take, but a few days ago there was a discussion in the House of Commons on the general maritime policy of the Dominion in which Mr. Fielding, the Minister of Finance, made a statement which has given much encouragement to the shipbuilders, who, ever since it was known that the bounties on iron and steel were to be continued, have been sanguine that the Government will before the Parliamentary session of 1906-07 come to an end pass an enactment providing for the payment of bounties—\$6 a ton, it is expected—in respect of steel vessels built in Canadian lake and coast yards.

Foreign Vessels Now in the Coastwise Trade.

Practically the whole maritime policy of Canada was reviewed in the discussion of a resolution proposed by Mr. Black, of Windsor, Nova Scotia, calling upon the Government to close the coasting trade against all non-British vessels. Ever since the coal trade of Nova Scotia began to assume large proportions foreign vessels have been permitted to carry coal from one Canadian port to another under an Order-in-Council which suspends the law restricting the coasting trade to vessels on the British or Canadian register.

Foreign vessels in recent years have come increasingly into this trade, especially the trade between Sydney and Quebec, Montreal and other St. Lawrence ports. Last year, of 1,500,000 tons of coal carried from Sydney to the St. Lawrence only 404,000 tons went in British or Canadian vessels. The larger part of the shipments was carried by Norwegian steamers; and to-day most of the ore which is imported from Belle Isle, Newfoundland, for use at the furnaces on both sides of Sydney Harbor, Cape Breton, is also carried in steamers flying the Norwegian flag.

Many of these ore and coal freighters—including several which have a cargo capacity up to 7000 tons—were built in England. But they are owned by Norwegians, and manned by Norwegians; and the complaint against these vessels in the Maritime Provinces is that excepting bunker coal none of their supplies are bought in Canada. Said Mr. Black, in submitting his resolution to the House of Commons: "They buy scarcely anything in Canada. They bring nearly everything with them. They cut down their expenses to a minimum; and then, of course, they can compete with and drive out Canadian vessels. They make arrangements in Norway for emergencies. Spare spars, spare machinery, everything they can possibly need for an ordinary emergency, they bring from their own country."

Another complaint made by Mr. Black against the Norwegian captains was that even when their vessels needed repairs or overhauling they would not give that business to the dry dock at Halifax. To support this part of his case he read a letter from the manager of the dock, who said: "At the close of the season a Nor-

wegian vessel collided with another vessel in the St. Lawrence, and we competed for the repairs to it against New York. Our bid was much lower than that of New York; but the Norwegian went to New York for repairs simply because she could get a load at New York. She was done with her charter party, and it was more convenient for her to go to New York for repairs than to leave a little money for repairs in the country from which she had taken everything."

Harbor Improvement Should Be for Canadian Vessels.

In view of the enormous amount of Government money that is now being expended in the improvement of Canadian harbors Mr. Black urged that it was not good national policy "to allow foreigners who leave nothing with us to monopolize our carrying trade;" that the Dominion Government should cancel the licenses to engage in the coasting trade now held by foreign vessels; and that in accordance with this policy of developing the merchant marine of Canada the Government without delay should enact a law under which tonnage bounties should be paid in respect of steel vessels built in Canadian shipyards.

All the speeches that followed—and there was quite a long debate—were in sympathy with this movement to exclude non-British vessels from the coasting trade. Sir Wilfred Laurier, the Premier; Mr. Fielding, Minister of Finance, and Mr. Paterson, Minister of Customs, were all in sympathy; and from Mr. Paterson the House had the statement that the Government was considering the question of withdrawing the coasting privilege from these foreign vessels. It was from Mr. Fielding, however, that there came the most significant statement regarding bounties for Canadian shipbuilders. He said:

It is not, after all, a question between Canadian and foreign ships. I am afraid a more serious difficulty arises between Canadian ships, which are British ships, and ships which in a narrower sense are British inasmuch as they are built in the mother country. Reference has frequently been made to the competition of foreign vessels; but after you have shut out all the foreign vessels you will still have to compete with the British ships. And we are in this curious position: The British ship goes free the world over where the British flag flies. She is admitted free into Canada; while many of the materials out of which that ship is built, if brought into Canada separately, would be subject to duty.

The conditions are therefore such as to discourage if not to prevent the building of iron and steel ships in Canada in competition with the shipyards of the mother country, which are conducted by men so widely experienced and who have such great capital and skill. Unless we are prepared to adopt the principle of taxing British ships coming into Canada—and there might be difficulties in the way of doing that, and gentlemen on both sides might see grave objections to it—there is no way in which we can aid our shipbuilding enterprise other than by the direct way of granting a bounty. The shutting out of foreign vessels will not suffice. If we are to agree that it is important to expand our shipping interests, I see no way in which this can effectively be done other than by the granting of a bounty. That matter has been before the Government and is still under consideration.

In connection with this statement by Mr. Fielding it should be added that it came out in the discussion that at a Liberal meeting in St. John, New Brunswick, two weeks ago, at which Mr. Emmerson, Minister of Railways, was the principal speaker, a resolution was adopted, urging the Government to grant tonnage bounties to Canadian shipbuilders. When it is remembered that Mr. Emmerson is of the Laurier Cabinet, this resolution is almost as significant as Mr. Fielding's speech. In a word, it begins to look as though shipbuilding bounties are now assured, and that there will be no opposition in Parliament that will count for anything when the Government submits the new bounty legislation.

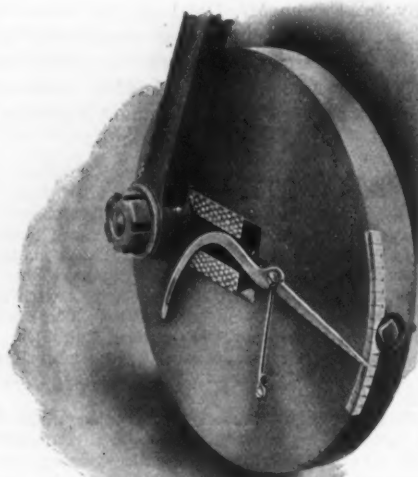
Only the Nova Scotia coal companies and the iron and steel plants in the neighborhood of Montreal will be inconvenienced if the Norwegian steamers are excluded from the coasting trade. Their exclusion will mean higher prices for Nova Scotia coal at Montreal. The iron and steel plants at Sydney, whose owners now charter the Norwegian steamers for the ore carrying business from Belle Isle, from April to December, can be affected only indirectly, because the trade between Newfoundland and Nova Scotia is intercolonial as distinct from interprovincial, and legislation regarding it cannot be enacted at Ottawa.

E. P.

The Dill Stroke Indicator.

An ingenious device for indicating the length of stroke that a slotter is set to is now made by the T. C. Dill Machine Company, Incorporated, Philadelphia, Pa. Those familiar with the difficulties in setting the stroke of a slotter by guess know that invariably only an approximately correct stroke is obtained, because it is too much trouble to get it exact. The time lost by too long a stroke will be much greater than the time lost in trying to get it right. Such is the reasoning, and so the machine is allowed to run with a longer stroke than necessary, whereas, had the stroke been right, the machine could perhaps run a speed faster, making more strokes per minute, yet at the same cutting speed.

The accompanying illustration of the crank disk and connecting rod of a slotter shows the construction and operation of this indicator. It is simply a steel strip, pointed at one end, curved at the other and pivoted near its center to the crank disk. The curved end is held in sliding contact with the crank pin bushing by a spring, as shown, and when the pin is adjusted from or toward the center of the crank disk it deflects the indicator pointer an amount proportional to its movement and



An Indicator for Showing the Stroke of a Slotter, Made by the T. C. Dill Machine Company, Philadelphia.

determined by the shape of the curved end of the indicator. The latter is such as to move the pointer over equidistant spaces for equal movements of the crank pin, and the scale on the crank disk over which the pointer plays is graduated in inches of stroke.

A Remarkable Electric Lamp Collection.—The historical collection of incandescent electric lamps made by William J. Hammer, New York City, and exhibited by him at the St. Louis Exposition in 1904, where it was awarded a grand prize, has, with its recent additions, brought its owner the award of the Elliott Cresson medal by the Franklin Institute. It now numbers over 1000 specimens, embracing examples from among the first and in many cases the first and only lamps of their type which have been made. These lamps have been accumulated during the last 25 years and very completely represent the stages in the work done by Thomas A. Edison, as well as showing most of the earlier lamps brought out by his contemporaries here and abroad. Since its exhibition at St. Louis the collection has been supplemented with samples of the various new lamps, particularly tantalum, tungsten and osmium lamps, so that it thoroughly exemplifies the history of the art. It is Mr. Hammer's wish that the collection may ultimately find place in an engineering museum, where it would be of great service to the historian and an inspiration to the young engineer and inventor.

Analysis of Phosphorus in Steel.

BY H. E. SLOCUM, PITTSBURGH.

Being called upon to make a complete analysis of the steel from each open hearth heat before it is rolled, I found it necessary to find some method by which the phosphorus could be determined rapidly and accurately. After considerable experimenting, the following method has been adopted in our laboratory and has been found to be satisfactory in every respect. By this method, a phosphorus determination can be made by an experienced man in from 9 to 13 minutes from the time the steel is weighed off. The method is as follows:

Two grams of steel, free from scale, are placed in an 8 oz. Erlenmeyer flask, to which 40 cc. of nitric acid, 1.13 sp. gr., are added and the flask is placed on hot plate. As soon as the steel is dissolved, add 5 cc. of potassium permanganate and boil the solution until oxidation is complete. Now add from 7 to 10 cc. of sodium nitrite, thus causing a reduction of the manganese oxide.

The solution now becomes clear and is cooled to 80° C; add 40 cc. of molybdate solution, to which has been added from 4 to 5 cc. of ammonia, 0.9 sp. gr.; shake the flask for two or three minutes. The flask is now placed in a centrifugal machine, and, after a few revolutions, the phosphorus is completely precipitated. Filter the (hot) solution through 11 cm. filter paper, using suction. Wash the paper with a solution of sodium nitrate until free from acid.

The paper plus the phosphorus is placed in a 16 oz. Erlenmeyer flask, to which has been added 30 cc. of distilled water, free from CO₂. After a few revolutions of the flask the phosphorus is completely washed from the paper. Now add from a burette 6 to 12 cc. of standard solution of sodium hydrate, according to the amount of phosphorus. This, with a little practice, can be determined by the amount of precipitate in the flask.

A cork is placed in the flask and the contents are shaken until the phosphorus is dissolved, which can be easily seen, as the solution becomes white; now add a few drops of phenolphthalein as an indicator (10 grams phenolphthalein + 1000 cc. 50 per cent. alcohol). After enough sodium hydrate has been added, the solution should be pink in color; now add from a burette, drop by drop, a standard solution of nitric acid until the pink color entirely disappears. This standard nitric acid and sodium hydrate are of equal strength.

The difference in the readings of the burette gives the percentage of phosphorus.

To make a standard sodium hydroxide solution, weigh off 16 grams of sodium hydroxide that has been treated with alcohol; dissolve in 800 cc. of water, and add a solution of barium hydrate until all the impurities are eliminated. Filter at once and make up to two liters.

To make a standard nitric acid solution, 20 cc. nitric acid (1.42 sp. gr.) are diluted to two liters with water.

These two solutions are approximately the value required, but should be standardized against the yellow ammonium phospho-molybdate and the solutions diluted until one cc. is equal to 0.01 per cent. of phosphorus when two grams of steel have been used.

The permanganate solution is made by adding 44 grams of permanganate to two liters of water.

For sodium nitrate add 25 grams of sodium nitrite to 4500 cc. water.

For sodium nitrate (wash water), add 25 grams of sodium nitrate to 8000 cc. water.

For the molybdate solution Wood's formula is used.

A bill has been introduced in the Wisconsin State Legislature for the establishment of a Wisconsin School of Mines. It is proposed to have the school located at Platteville, which is in the heart of the zinc mining district of the State. The building formerly used by the Platteville Normal School is available at that city, and would answer all present demands. The promoters of the school insist that it shall be under the control of a board made up of practical mining men, as is the case with the Michigan School of Mines.

The Pennock Iron Bender.

A labor saving device for bending iron by hand to almost any shape is shown in Fig. 1. It is known as the Pennock iron bending machine and is made by the American Road Machine Company, Kennett Square, Pa. Fig. 2 illustrates a few of the many different shapes it will produce in bending iron.

The long lever A, Fig. 1, only part of which may be seen, for it is about 5 ft. long, is the handle operated in bending material. It fits into a pocket in the moving die so that it is readily detachable. In action the movement of the lever is downward, the direction in which the greatest power can be exerted. There are two dies on the machine, an upper and a lower one. The latter, indicated at B, can be moved horizontally by the hand wheel C. The material to be bent is inserted vertically between the two dies at the point D, and by operating the

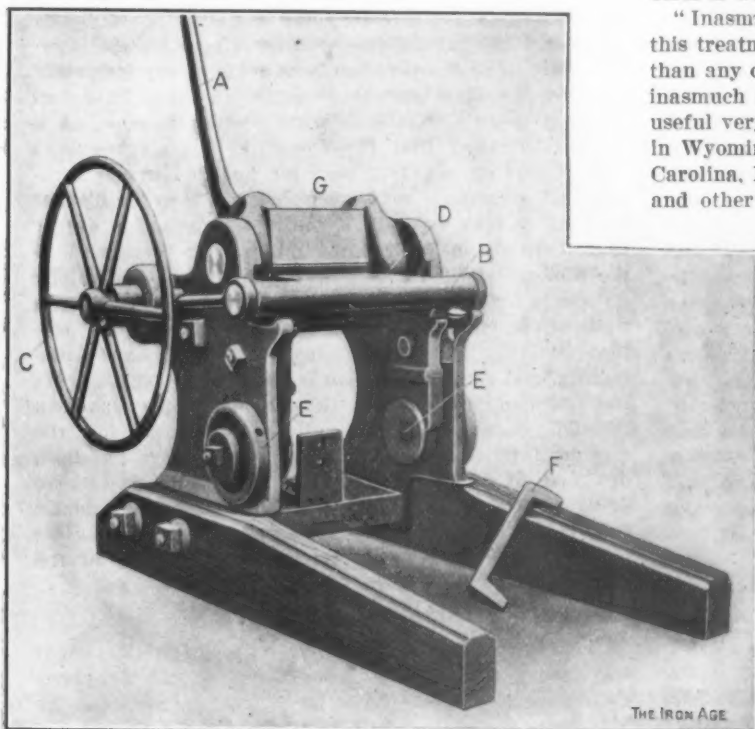


Fig. 1.—The Pennock Iron Bender, Made by the American Road Machine Company, Kennett Square, Pa.

hand wheel the dies are made to clamp the piece at one side of the desired bend. The movable die B, being operated by an eccentric on the hand wheel shaft, holds the material firmly when it is clamped. The lower die can also be moved vertically through the eccentric E, to accommodate varying thicknesses of material, and also to allow for setting different angle blocks on top of the lower die, to make bends at different angles. One of these angle blocks, shown at F, is furnished with each machine. The material being inserted and clamped is bent by pulling the lever A downward, which brings the upper die G in contact with the work, forcing it down to the lower die if a right angle bend is wanted, or to the angle block if an obtuse angle is desired.

This is a very simple and expeditious way of bending light materials and the machine is one that will be found of much usefulness in all shops where it would not pay to install a large power bender or where there are not enough pieces of one particular shape to be bent to warrant making special dies for a power machine.

The Bureau of Navigation at Washington reports that for the calendar year 1906 the vessels built in this country and registered numbered 1045 of 393,291 gross tons; for 1905, 1054 of 306,563 gross tons; for 1904, 1065, of 265,104 gross tons; for 1903, 1159, of 361,970 gross tons, and for 1902, 1262, of 429,327 gross tons.

Electric Smelting of Black Sands.

WASHINGTON, D. C., January 26, 1907.—In response to a resolution of the Senate calling for information in regard to the results obtained in the investigation of electric smelting processes in the course of the examination of the useful minerals contained in the black sands of the Pacific Slope, which has been in progress during the last 18 months, the director of the United States Geological Survey has forwarded to Congress a special report prepared by David T. Day, C. E. Wilson and G. H. Clevenger, who conducted the experiments.* In transmitting the report the director says:

"While the report submitted deals entirely with the application of known electric smelting processes to the particular iron sands investigated, it contains many suggestions of beneficial modifications of electric processes themselves tending to facilitate the smelting of titaniferous iron ores. Therefore the study of electric smelting processes is worthy of careful consideration.

"Inasmuch as the sands of the Pacific Slope afford, by this treatment, ore in larger quantity and of better grade than any other iron ores known on the Pacific Coast, and inasmuch as electric smelting gives promise of rendering useful very large supplies of titaniferous iron ore well known in Wyoming and Colorado, as well as in Virginia, North Carolina, New York, New Jersey, and also in Connecticut and other New England States, I think that a compre-

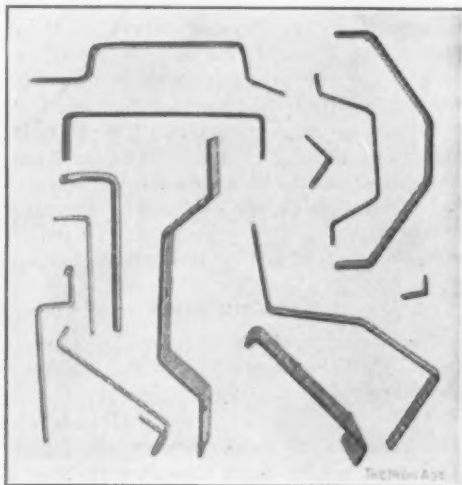


Fig. 2.—A Few of the Many Shapes It Will Produce in Bending Iron.

hensive investigation of this subject would be of service. If it is to be done the sum of \$50,000 should be provided for the purpose."

The Secretary of the Interior has recommended to Congress that an appropriation of \$50,000 to continue these experiments, suggested by the director of the survey, be made at the present session, and there is reason to believe that this will be done. The experiments have attracted a great deal of attention among Senators and Representatives from the Western States, owing to the magnitude of the deposits of black sand and magnetite, which, in their opinion, promise to afford the basis for the establishment of an important branch of the iron and steel industry.

W. L. C.

Much difficulty is generally experienced in getting paint to adhere firmly to galvanized iron, and various experiments have been made in order to find a way of avoiding this trouble. The Government has adopted a mode of procedure which seems to give satisfactory results. The specifications call for the use of vinegar in washing the surface before painting. This roughens or corrodes the surface, and gives the paint much better adhesion.

* This report is precisely the same as the account of the experiments printed in *The Iron Age*, December 28, 1905, page 1742.

Greater Ore Unloading Plants.

DULUTH, MINN., January 26, 1907.—The chief drawbacks to heavy shipments of iron ore have always been the inadequacy of equipment at lower lake receiving docks. This is in a fair way to be remedied before the opening of the season of 1907. No less than 13 fast, modern, electrical unloading plants are being erected by the Brown Hoisting Machinery Company at Lake Erie docks, in addition to several other plants of the same general style, but not so rapid, going in at other points. There are also some seven Hulet unloaders under contract or construction for Lorain and Gary works of the United States Steel Corporation, but the most of these will not be in service for two years. Four large new brown fast plants are to be ready at Cleveland by the opening of navigation, and six are under construction at Fairport. Each is good for about 300,000 tons of ore in a season, and all will make a very decided addition to the possibilities of the year.

The total shipments of last year, amounting to some 38,000,000 tons, kept the entire lake fleet busy from the opening to the very close of navigation, with what other business there was in sight. The best information available indicates that there is an ore tonnage for 1907, afloat and to be launched, that will give capacity for about 42,000,000 tons. The Steel Corporation's increase over last year will be about 2,000,000 tons. Both vessel and iron ore men expect the ore fleets to be quite busy all season, and there has been no drop in freight rates on account of the increased capacity. Most of the independent fleets operating in the ore trade have taken charters for the year up to what they consider a safe limit at this time, this varying in accord with the ideas of the management from 65 to 100 per cent. of their capacity. Practically all ore to be moved from Steel Corporation mines has been covered. Nearly all independent steel makers will move as large or a greater proportionate tonnage than the corporation, for most of them will be cleaned out of ore by the opening of navigation next spring.

New Republic Mines on the Mesaba.

The Republic Iron & Steel Company has recently purchased three properties on the Mesaba range and is strengthening its position in good ores as much as possible. The three mines are the Onondaga, lying in the north one-half of the southwest one-quarter of 4-58-17, which was bought from Congdon, Hartley & Longyear; the Mariska, in the west one-half of the southwest one-quarter of 24-58-17, and the Monica, in the northeast one-quarter of the northwest one-quarter of 9-58-16. Both the Mariska and Monica were bought from A. B. Coates, A. M. Miller and others. The royalty on the Onondaga is 75 cents per ton, and on the other two 55 cents, and the total tonnage of the three is about 1,500,000. All are underground mines, and shaft sinking on all will begin in a few days. Shipments from the three will be about 75,000 tons for the present year. This company will operate much more extensively this year than ever before, and its Kinney is to be one of the important properties of the district.

The Steel Corporation's Operations.

So far as can be learned nothing has yet been undertaken by the Oliver Iron Mining Company in the way of development upon the Great Northern ore lands. It will probably be some time before preliminaries have been so far settled that any work can begin on these lands, and the amount of ore to be mined this year will doubtless be even less than has been anticipated in this correspondence. The Oliver Iron Mining Company, however, is preparing in other directions for a very large business. In addition to the stripping of its Gilbert mine in section 28-58-17, it is to open the old McKinley mine in 8-58-16, and will strip the surface and mine by the milling process there. The Gilbert cannot be worked the present year and the McKinley deposit is not a large one, as Mesaba ore bodies go. The large work of stripping the Virginia group has not begun, and may not be undertaken very soon. An immense amount of work is being done at the Hull and Rust, and other properties in the Hibbing vicinity,

and at the Mountain Iron, where a very large product will be taken this year. The Fayal, too, is to be mined heavily. When the Gary works of the Steel Corporation are completed and taking the vast amount of ore they will require there will be a much simpler problem than now for the mining end of the corporation, for ores of a much wider range and found in far greater quantity than now demanded will be taken.

A Longer Life for the Gogebic Range.

At the Newport mine, Gogebic range, the company is sinking its new steel framed incline shaft as rapidly as possible, and is making a most interesting contribution to the development of the district. The newer finds of excellent ore at depths of about 2000 ft. in the east end of this mine have been known for a long time, and this shaft is being sunk to develop them for extensive mining. It is 28 x 8.5 ft. and contains five compartments, four skipways and a pipeway. It is unique in cross section, as the figures show. The upper part of this shaft down to the ledge is lined with concrete. The bore itself is now about 600 ft. deep and will be bottomed during the year 1908, but little ore can be mined through it before 1909. The Newport has been made a very important mine by the developments at depth, and they have had an even more emphatic bearing on the Gogebic as a whole, indicating that these ores do not pinch out at such depths as have yet been reached in deepest workings and assuring a very much longer life to the district as a whole. As a result of the new information deeper shafts are planned for many mines, and there will be the utmost activity in deep level developments all along the range for a long time to come.

Developments at the Shagawa mine—the famous section 30-63-11, Vermillion range—have not been satisfactory, and the shaft, which is now down about 500 ft., has revealed practically nothing more than was known through early drill explorations conducted for the Clergue interests four years ago. The shaft has been designed to go to the depth of about 1500 ft., where drills showed a soft formation that seemed to promise ore; but it is now in very hard formation and progress is exceptionally slow and costly. The outcome of the present situation is hard to predict.

Cleveland-Cliffs Company Acquisitions.

The Cleveland-Cliffs Iron Company has just bought the lands of the Deer Lake Company in Marquette County, some of which lie on the iron ore formation of the Marquette range, and will be explored. The Deer Lake Company was one of the first to engage in pig iron making on the upper peninsula, and its lands were originally covered with timber. The Cleveland-Cliffs Iron Company is securing large tracts in northern Michigan and is by far the chief landholder in that region, much of its acreage being in the district where iron may be looked for. It is certain that these lands will be developed as the company has opportunity, and it is probable that some of these developments will result as favorably as those which it has carried out during the past year or two near Princeton.

D. E. W.

The Cook County Court House.—Besides being the largest structure of its kind in the West, the new Cook County court house, Chicago, now in course of erection, enjoys the distinction of having used in its construction an amount of steel which, for tonnage, equals, if it does not surpass, that of any other building in the West. Some idea of the substantial solidity provided in its design may be had when it is stated that fully 11,000 tons of steel beams, plates and fabricated shapes have been wrought into its framework. This material, which was made, fabricated and furnished by the Cambria Steel Company, Johnstown, Pa., was distributed as to tonnage about as follows: Beams and channels, 3800 tons; plates, 3800 tons; angles, tees, zees and other shapes, 3100 tons; castings, 300 tons. Very heavy supports were required under the vault section, and the large box girders sustaining this weight were 13 ft. deep, 26 to 40 ft. long by 2 ft. 6 in. in width, the heaviest weighing 26 tons. Shipment of this material was completed between the months of May and November.

The Link Chain Belt.

A new transmission chain, especially designed for high speed driving but used for other link belt purposes, has been brought out by the Link Chain Belt Company, New York. In addition to its adaptability for high speed drives the special claims for the chain are strength, practically noiseless running qualities and compactness. In form it differs materially from the average link chain, as will be seen from Fig. 1. It has a single tapering hook



Fig. 1.—The Plain Links, Showing How They Are Coupled.

arranged to give proper clearance when engaged with the eye of the adjoining link. The back of the hook is enlarged into a projection which serves as a gear tooth to mesh in a sprocket wheel. The end of the hook is relatively flat, so that a chain comprised of the links may run smoothly as a belt when the chain is placed with its upper side in contact with pulleys. The chain can be operated crossed by reversing alternate links to put teeth on both sides. The various modified forms of the links shown in Fig. 2 illustrate the manner in which chains can be adapted for various forms of elevating, conveying and other machinery equipment.

The chain links are made in six sizes and of both malleable iron and steel. A malleable iron link $\frac{1}{4}$ in. wide, which is the smallest size made, it is claimed will stand

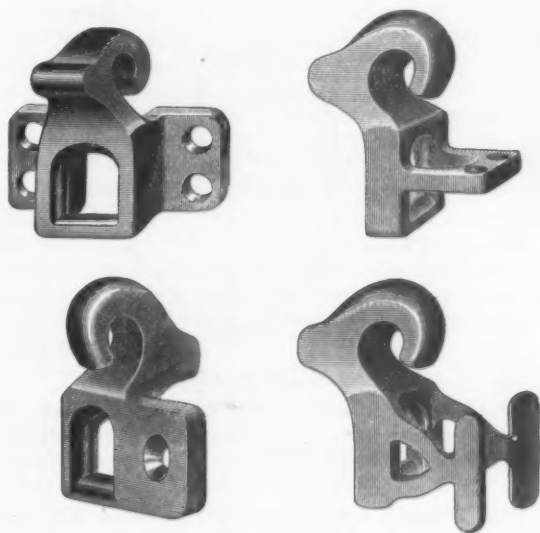


Fig. 2.—Modifications of the Link Used in Conveyor Work.

a breaking strain of 700 lb. The malleable iron links are made in stock sizes up to 2 in. wide, and larger to order. The steel chains range from $\frac{1}{2}$ to 2 in. wide and the largest it is claimed will stand a breaking strain of 28,000 lb. From the standpoint of strength the company asserts that its $\frac{1}{4}$ -in. chain is equal to No. 25 of the standard style and the 2-in. chain to No. 160 of the old style chain and takes much less space.

The chain works on the principle of an internal gear and can be used within 17 and 24 in. centers as a direct drive to motors. It has been run at a speed of 850 revolutions of a main shaft with comparatively little noise. The fact that the sides, corners and hooks of the links are rounded lessens the liability of the chain to clog with grease or dirt. As a cross belt chain it is stated that it will work within 4-ft. centers on the small sizes and from 8 to 12 ft. on the larger sizes. It has been run at a

quarter turn on the larger sizes within 18-ft. centers with good satisfaction.

When used for driving by motors the chain has had marked success. An idea of its adaptability for such purposes can be had from Fig. 3, which shows a 30-hp. motor driving an elevator hoist through a 2-in. steel chain running at 1800 ft. per minute, the distance between shaft centers being 23 in. This equipment is in the basement of the Metropolitan Safe Deposit Company, 3 East Fourteenth street, New York, and since its installation several months ago the chain has given no trouble whatever, although as a test it has been run at a higher speed.

As a conveying chain in construction work the chain belt has been found adaptable and it has also been used for coal conveying equipment and as a drive for concrete mixers. The company also furnishes sprocket wheels in various sizes. The executive offices of the company are

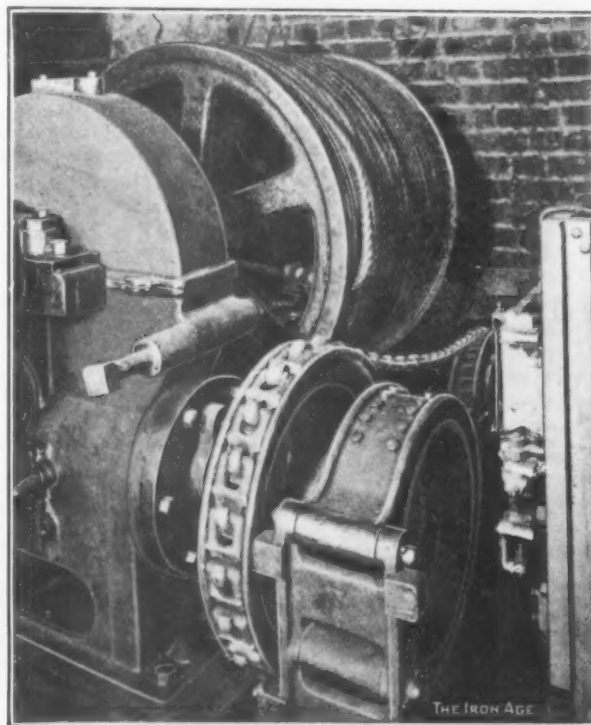


Fig. 3.—The Chain Used for Transmitting Power.

at 60 Wall street, New York, and its salesrooms at 52 Dey street. The company has been recently organized under the laws of New York with a capital of \$250,000.

Novel methods of variable speed control are a feature of a motor driven mine ventilating plant installed at Eschweiler-Aue, Germany. The blower has a wheel 9 ft. in diameter, with a 4-ft. 6-in. face, taking suction axially and discharging upward through a delivery casing of concrete measuring in section 7 x 9 ft. At 300 rev. per min. the normal discharge is at the rate of 70,000 cu. ft. per minute, the power required being about 80 hp. The maximum duty of 92,000 cu. ft. per minute is obtained at 370 rev. and with an expenditure of 136 hp. Power is delivered by alternating current at a pressure of 5500 volts. For variable speed operation the fan is connected to two 80-hp. synchronous motors, one of which is placed at each end of the shaft. These work in parallel at the higher speeds, but for lower speeds a 16-hp. synchronous motor is coupled direct to one of them and the rotor currents are passed into this instead of into resistances. This motor thus restores to the shaft energy which would otherwise be lost.

Milliken Brothers, Incorporated, 11 Broadway, New York made their best record with their new blooming mill, Staten Island, for the night turn of January 22-23, turning out 356 gross tons of billets and blooms. This record is phenomenal, considering that the mill is new and that during the turn 155 min. were lost waiting for steel.

The Pettit & Barrows Gas Washer.

BY FRANK PETTIT.

A new form of gas cleaning apparatus for removing dust from blast furnace gases has been patented by Frank Pettit and W. A. Barrows, Jr., of Sharpsville, Pa. It belongs to the class of primary cleaners, intended to treat initially large volumes of blast furnace gases, (60,000 to 75,000 cu. ft. per min.), in a simple and inexpensive manner. The apparatus has no moving parts and requires practically no attention. Its purpose being the cleaning of gas suitable for burning in stoves, boilers, &c., it does not aim to perform the functions of an expensive gas refining plant, necessary only for gas engines.

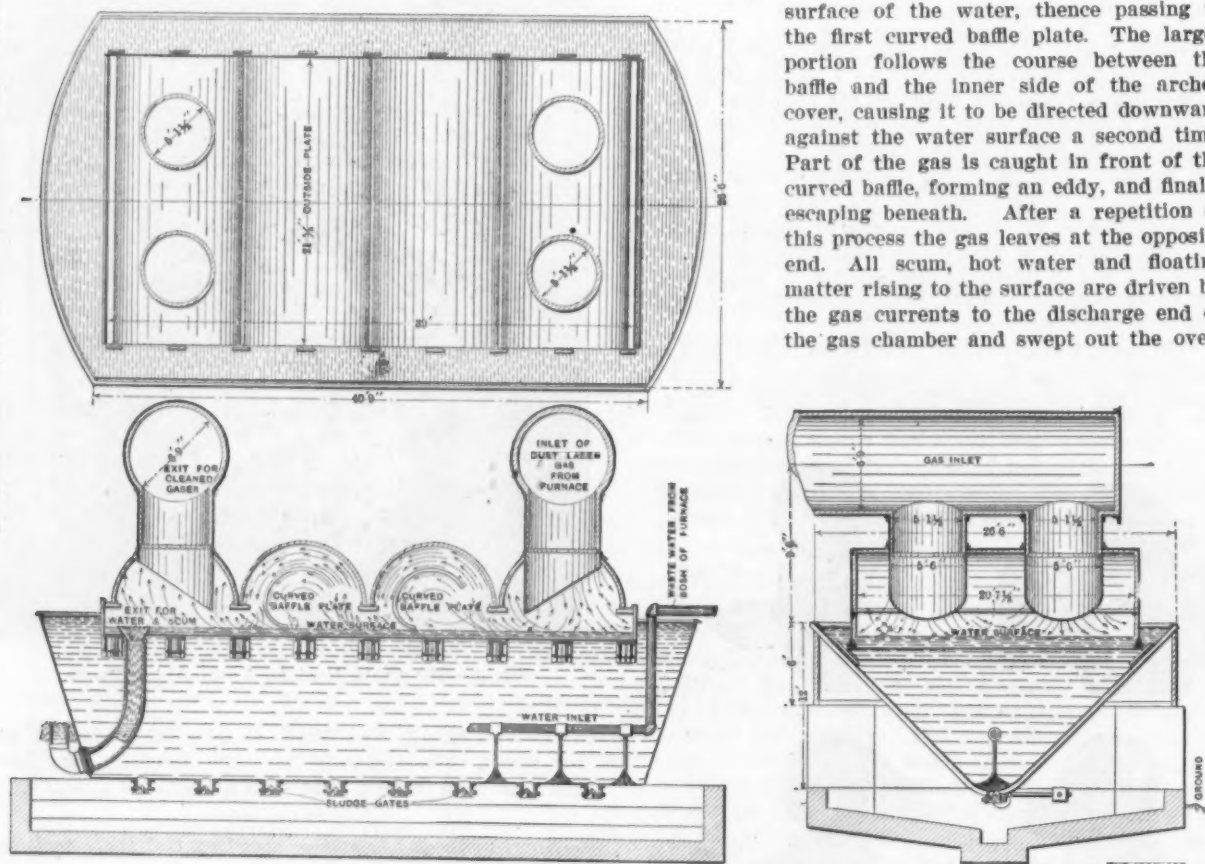
Ever since the waste gases from blast furnaces have been diverted and applied to useful effect, trouble has been experienced by accumulations of dust carried over by the gas currents and deposited in flues, under boilers, in stoves, &c. Even previous to 1850 European engineers constructed apparatus for the removal of dust by passing

culty arose from the forming of a coalescent scum on the water surface, apparently of fine coke dust and heavy hydro-carbons produced by chemical reactions within the furnace, this scum soon rendering the apparatus inoperative unless provision is made for continually removing it. This can be readily illustrated by holding a porcelain tray of water near a small gas leak.

The efficiency of an apparatus for removing the finer impalpable dust particles depends solely upon the extent of clean water surface in contact with the gas and the thoroughness with which the gas is stirred and forced to present new surfaces to the water.

The illustration shows a gas washer suitable for use with a furnace producing 300 to 400 tons of iron per 24 hr. It consists of a water vessel with inclined sides, provided with sludge gates at the bottom for drawing off sediment, and a gas chamber, closed by a water seal on all sides, which permits scraping the sediment from the sides of the water vessel while in operation. The gas enters at one end of the chamber, preferably by two nozzles as shown in the end elevation, for better distribution, making one impingement on the

surface of the water, thence passing to the first curved baffle plate. The larger portion follows the course between the baffle and the inner side of the arched cover, causing it to be directed downward against the water surface a second time. Part of the gas is caught in front of the curved baffle, forming an eddy, and finally escaping beneath. After a repetition of this process the gas leaves at the opposite end. All scum, hot water and floating matter rising to the surface are driven by the gas currents to the discharge end of the gas chamber and swept out the over-



Plan and Longitudinal and Cross Sections of the Pettit & Barrows Gas Washer.

the gas over the surface of water, similar to those in present use. At the moderate rate blast furnaces were driven in the earlier days, and the favorable character of the ores then in use, but little dust was carried over, and with suitable cleaning doors provided it could be removed easily by hand labor. With the advent of the present large blast furnace, driven at a pressure of 20 lb. per sq. in., employing a higher temperature, and, still more recently, the discovery that it was feasible to use high percentages of, or all, Mesaba ores, the problem of dealing with the dust became serious; 3 to 5 per cent. of the ore fed into the furnace passed out as dust. This resulted in one stove and one or two boilers to each furnace being continually idle, while the dust was removed by expensive hand labor. This naturally resulted in calling forth numerous devices designed to meet the evil.

The fact, discovered by the early French engineers, that extremely fine particles of ore suspended in furnace gases adhere readily to the surface of water when brought in contact with it, has formed the basis of the most successful of these present devices. The next diffi-

flow. This feature, which insures the water surface being always clean and active, is patented.

The apparatus is set sufficiently low for the waste water from the bosh of the furnace to furnish adequate supply by simple flow. The method shown of applying the water prevents the sediment from packing between the sludge gates, facilitating its removal. The only attention required is to draw the sediment from the sludge gates every 8 or 10 hr., allowing it to flow to a settling pit, from which it is easily dredged out every 24 hr. by the crane that serves the clinder pit, either to be discarded or to be formed into briquettes.

The top and sides of the gas chamber are brick lined to avoid undue loss of heat from the hot gas, which is usually at a temperature of 400 to 600 degrees F. The gases can be discharged directly from furnace into this washer, its large passages being free from clogging in case of even the heaviest slip.

A gas washer of this type has been in use for two years at the plant of the Shenango Furnace Company, Sharpsville, Pa., during which time it has well demon-

strated its capacity to remove dust, withstand frequent heavy slips of the furnace, gas explosions, and the action of hot gases on the inner baffles.

In use a thick scum gradually rises on the water surface outside the gas chamber, attaining a thickness of several inches, and able to support an umbrella or walking cane. It is reasonably certain that in an apparatus not provided with means for its continuous removal the water surface within the gas chamber is similarly fouled. An approximate cost of this washer may be placed at \$10 per square foot of active water surface in contact with the gas.

Canada's Increasing Manufactures.

Overflow from the United States.

TORONTO, January 26, 1907.—Large industrial concerns in other countries still look favorably upon Canada as a field for colonization. That is, parent companies in the United States and in some cases in Great Britain, are still planning branches here. In the year just closed this outside enterprise added many new manufacturing works and a large amount of capital to Canada's producing capacity. Nearly all the new industries thus acquired have come from the United States, whose manufacturers and capitalists perceive and seize opportunities here long before British promoters are impressed with the favorable outlook. American capital originated the great coal and steel plants at Sydney; it created two of the three huge power works on the Canadian side of the Niagara River; it brought into existence the cluster of industries controlled by the Lake Superior Corporation at Sault Ste. Marie; it is developing the power resources of the Rainy River at Fort Frances; it built up the nickel industries at Copper Cliff and Victoria mines. These are among the most conspicuous of the enduring monuments to American manufacturing enterprise in Canada. If a census were taken of all the manufacturing establishments in Canada that are sprung from American industries or that have been nurtured into strength by American capital the exhibit would be a surprisingly large one. In Canada's mineral resources a large amount of American money is bound up. Promising iron mines here have passed under the control of steel industries south of the boundary line. In the rich silver area about Cobalt, millions of American dollars have been ventured. More millions will probably be put into works for the smelting and refining of the minerals from that mining field. Of recently established branches of United States concerns the International Harvester Company's works at Hamilton; the Locomotive & Machine Company's works at Montreal, and the Plymouth Cordage Company's works at Welland are very notable for their magnitude.

Coming Industries.

For some time before the opening of the present session of Parliament promoters of American enterprises in this country refrained from closing pending negotiations with towns and cities here, uncertainty as to the character of the expected tariff changes serving as a check upon their operations. Since the appearance of the new schedules there has been some revival of American interest in Canadian centers suitable for the locating of branch works. At the present moment Toronto's Commissioner of Industries is in communication with representatives of two American concerns in relation to the obtaining of sites in the city for iron and steel works. A Montreal syndicate is also in correspondence with him concerning a site for a similar purpose. These and other negotiations of longer standing have started the city upon the work of reclaiming Ashbridge's Marsh, which, when filled in, will add 412 acres of water front land admirably suited for manufacturing locations. At the annual elections held in the municipalities of Ontario at the beginning of this month special money by-laws were voted on and carried by the rate payers in several towns and villages, the object of the by-laws in each case being the ratification of an agreement committing the town to the aid of some projected industry, whether by bonus, bond guarantee, stock subscription, free site or tax exemption.

The passing of these by-laws insures to Ontario the addition of a considerable number of important industries.

Demand for Electrical Plant.

Eighteen other municipalities have followed Toronto's example and passed the by-law enabling their several town and city councils to enter into a 30-year contract for large blocks of power from the Hydro Electric Power Commission. On all hands it is expected that the contracts will prove immensely stimulating to industry in these western Ontario centers. Once bound to accept delivery of quantities ranging from 1000 to 15,000 hp., these towns will feel constrained to bestir themselves to secure new manufacturing works. That may involve more pledging of the municipal credit in the form of bonuses, &c. With power supplied at a price less than half it is now costing, these towns ought to be able to attract new industries and make more flourishing those they already have.

To manufacturers of electrical plant of all kinds the vote of these 18 municipalities, committing themselves to the economy of cheap power, ought to be very interesting. It means the installment of 18 separate substations and internal distributing systems, and the equipment of manufacturing works with the machinery necessary for the application of about 40,000 hp. Take the case of Toronto. According to the estimate of the Hydro Electric Power Commission Toronto's receiving station and distributing system will cost very close to \$2,000,000. In each of the other municipalities a proportionate outlay will have to be made on like plant. Then the works of new manufactories, and of old manufactories discarding their coal power apparatus, will require their electrical outfit. If the venture of the 18 towns and cities in question proves as fortunate as is expected there will be a score more to hitch to the transmission line and to present their demand to the manufacturers of electrical equipment.

C. A. C. J.

The Foundrymen's Convention at Philadelphia.

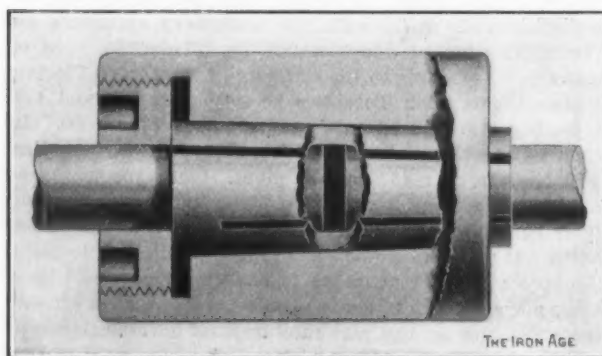
The secretary, Dr. Richard Moldenke, has issued a circular making announcement of some features of the next convention of the American Foundrymen's Association, which will be held in Philadelphia, May 21 to 24, 1907. The association was organized at Philadelphia in 1896, and this year's convention will be the first held there since that time. The secretary notes that in view of the large attendance expected an important change is necessary in the entertainment features which have accompanied the association's conventions. The special entertainment being prepared by the Philadelphia foundrymen will be limited to members of the association, visiting ladies, members of affiliated associations, visitors coming to attend the organization of the Brass Founders' Association, and such guests as secure from the secretary when they register the proper credentials for the special trips and the dinner. Others in attendance will be asked to contribute \$5. For participation in the entertainment the number of representatives of any firm belonging to the association or to the Philadelphia bodies is limited to two for Philadelphia and vicinity. Where firms in outside cities, members of the association, send more than two representatives each the secretary expects a letter notifying him of the fact and giving the names of such representatives.

Papers of value to the foundry trade are promised for the meeting, and the programme in this respect, it is said, will be fully up to those of previous years. The secretary requests brief notes of experience from members, so that these may be put in shape for presentation at the convention. The working exhibits of foundry equipment are expected to surpass anything of the sort heretofore attempted. This exhibition, which will be at the Second Regiment Armory, the headquarters of the association during the meeting, will be open from May 20 to 26.

Representative Steenerson of Minnesota has introduced a bill in the House of Representatives providing that the President shall appoint a commission to inquire into the tariff question in all its phases, including the advisability of maximum and minimum duties.

The Hart Shaft Coupling.

With the intention of improving on the split sleeve type of shaft coupling, in which the parts are simply clamped to the shaft, H. C. Hart of the Hart Mfg. Company, Unionville, Conn., has invented the coupling here-with illustrated. As will be seen from the broken out sectional view given there are only three parts to the coupling—an outer collar or drum having a tapered bore, a split cone that fits the shaft and is tapered to correspond to the drum, and a nut for drawing these parts together to compress the cone on the ends of the shaft to be coupled. The nut has a bearing on the large end of the conical split sleeve, so that when it is screwed into the outer member the latter is drawn toward the nut in a direction to effect a reduction in the diameter of the split sleeve. As will be readily appreciated the mechanical principle employed is such that a relatively small force applied to effect the clamping produces a very powerful compression on the sleeve. The coupling has the advantage of dispensing entirely with bolts or



A Simple Shaft Coupling Made by the Hart Mfg. Company, Unionville, Conn.

projecting parts, which would be a menace to any one working near the shaft. At the same time the coupling may be used as a small diameter pulley for driving light machines.

A modified form of the coupling is made for larger shafts and for cases where the shafts to be joined are of different diameters. It has two separate conical sleeves, tapering in opposite directions, and they are seated in a single collar having corresponding tapered recesses. The three parts are firmly seated by two inclosing cup shaped members, one screwing into the other, so that when the two are tightened together they force the split cones into the collar, uniformly distributing the compression exerted on each. Antifriction rollers in the large ends of the conical sleeves decrease the friction between the parts when the binding members are tightened. Like the simpler form of coupling, this one is devoid of bolts or unnecessary projections that would be liable to catch the clothing of operators, pick up belting or in any way be a source of danger.

Rock Excavation by the Lobintz Process.—The Empire Engineering Corporation began work at Buffalo December 28 on its contract with the United States Government for the excavation of the Niagara River Ship Canal, which is to enable deep draft vessels to pass down the harbor and out into the Niagara River by lock below Black Rock Harbor. The contractors are to excavate a channel in the inner harbor $1\frac{1}{4}$ miles in length, 200 ft. in width and to give a depth of 23 ft. The channel to be excavated is through solid rock, and the Lobintz rock breaking method will be employed, doing away with the use of dynamite or blasting materials. The Lobintz rock breaker is a machine having a vertical steel shaft 28 in. in diameter and 35 ft. long, and weighing 46,000 lb., which is elevated from 6 to 8 ft. and then dropped on the solid rock in the bed of the harbor, breaking the rock into pieces, which are easily taken up by the rock dredges. The Lobintz machine used in the

work was made in Scotland, but the heavy steel shaft chisel, or breaker, was made by the Bethlehem Steel Company.

The Shipments of the German Steel Syndicate.

Under date of January 16 the Stahlwerks Verband of Düsseldorf issues the following statistics of shipments, the first table covering billets, blooms, sheet iron, &c.:

Shipments of Steel Billets, Blooms, etc.

	Metric tons.	Metric tons.
	1905.	1906.
January	127,081	175,962
February	121,905	156,512
March	175,396	178,052
April	157,758	153,891
May	169,539	158,947
June	151,789	156,869
July	146,124	145,658
August	170,035	147,384
September	170,815	138,280
October	177,186	158,284
November	173,060	150,077
December	169,946	142,008

Totals.....1,910,634 1,861,924

The shipments of steel rails, ties and other track material, computed in the equivalent of crude steel, were as follows:

Shipments of Steel Rails and Track Material.

	Metric tons.	Metric tons.
	1905.	1906.
January	112,804	154,859
February	118,701	155,071
March	147,844	172,698
April	120,803	147,000
May	152,159	179,190
June	145,291	148,167
July	120,792	149,931
August	121,134	146,354
September	133,868	148,528
October	156,772	176,974
November	145,758	181,331
December	155,538	175,144

Totals.....1,631,464 1,935,847

The shipments of shapes, beams, angles, ties and channels, computed in the equivalent of crude steel, amounted to:

Shipments of Shapes.

	Metric tons.	Metric tons.
	1905.	1906.
January	137,079	129,012
February	80,284	125,376
March	147,684	177,101
April	150,622	163,668
May	171,952	184,434
June	144,709	176,457
July	147,271	189,975
August	142,998	183,919
September	146,079	156,669
October	132,996	166,303
November	119,641	151,385
December	151,951	131,873

Totals.....1,631,464 1,935,847

The total shipment of these products was therefore 5,733,943 metric tons in 1906, as compared with 5,215,364 metric tons in 1905, an increase in 1906 of 518,579 tons, or 9.94 per cent. The figures for the export shipments are not yet available, but it is well known that a larger percentage was retained for home consumption in 1906 than in 1905.

Marchalite is being introduced to the steel casting trade of the United States by R. De Villers of the National Fuel & Briquette Machinery Company, 32 Broadway, New York. Marchalite has been in use for some time in European steel foundries for making easier the work of cleaning castings. It is applied as a coating on the mold, and it is claimed prevents to a considerable extent the mixing of sand with the molten steel. Much of the roughness of steel castings, particularly basic castings, is thus prevented. The inventor claims that better finished and therefore more marketable castings result from the use of marchalite; that much of the work of chipping and cleaning is done away with, thus making a considerable saving in labor.

Tests of Railroad Spikes.

Their Holding Force in Various Kinds of Wood Ties.

There has recently been issued by the Department of Agriculture Circular No. 46 of the Forest Service, entitled the "Holding Force of Railroad Spikes in Wooden Ties," which contains the report of tests made by Dr. W. K. Hatt, civil engineer in the Forest Service. The purpose of the tests, as explained in the report, was to compare the relative holding force of common, channeled and screw spikes when driven into railroad ties of both hard and soft woods. The ties were in different states of seasoning, and some had been treated with preservatives. Spikes of the various forms were driven into the same tie. The results do not necessarily show in general the relative capacity of various species to hold spikes. They compare the action of the spikes.

The common spikes used were about 5½ in. long by 9-16 in. square in the shank, 165 of them weighing 100 lb. The common screw spike was similar to those used on the French and other Continental railroads, 85 spikes to 100 lb. The channeled spikes were of about the same dimensions as the common spike but weighed less, 200 of them making 100 lb. The shank was 11-16 in. square in cross section, and had a channel cut lengthwise in the side away from the rail. The fourth type of spike used was

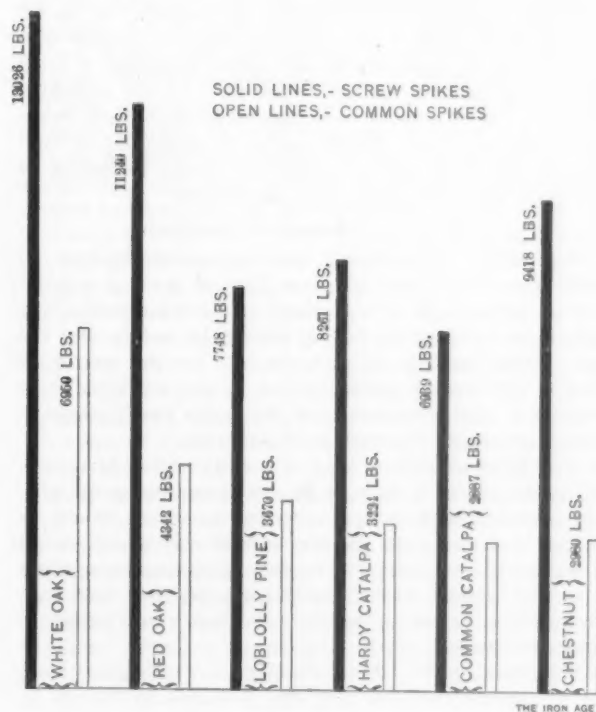


Fig. 1.—Graphic Comparison of the Holding Power of Screw and Common Spikes in Various Woods.

that designed by the Illinois Central Railroad, and was almost identical to the other screw spike, weighing about the same, and apparently differing only in the manner of finishing the thread under the head.

Method of Testing.

The common and channeled spikes were driven into the tie in the usual way to a depth of 5 in. For the screw spikes a hole was first bored of the same diameter as the spike at the base of the thread, and the spike was then screwed down to the same depth as the driven spike. No spike was used a second time. A special steel claw was constructed for gripping the spikes and pulling them from the tie in the direction of their length. The tie containing the spike was placed on top of the fixed head of a testing machine, so that the head of the spike extended into the opening in the center of the head of the machine. The pulling device was then slipped under the spike head, and its shank attached to the movable head of the ma-

chine. The descent of the movable head drew out the spike.

Results of Tests.

The results of the tests are given in tables accompanying the report. The substance of Table 1 is given graphically in Fig. 1 herewith, which compares the efficiency of common and screw spikes, and shows that the latter resists withdrawing with from two to three times the force of the former. As will be noticed, the advantage of the screw spike becomes more marked in the softer woods. Other information given in the table but not taken into account in the diagram included the number of tests with each spike in each kind of wood and the maximum

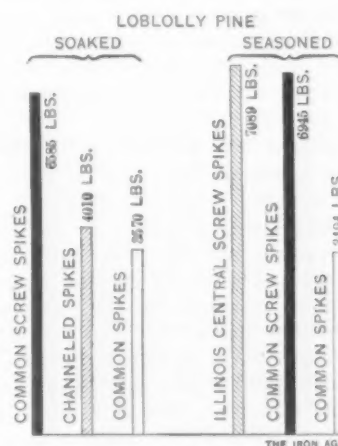


Fig. 2.—Holding Power of Various Spikes in Loblolly Pine Compared.

and minimum holding forces obtained. The diagram gives only the average. The white oak used was partially seasoned. The other oak (probably red) was seasoned, as was also the loblolly pine and the chestnut. The hardy and common catalpa ties were green.

The results given in Tables 2 and 3 of the report are graphically shown in Fig. 2. The left half of this diagram shows that in soaked loblolly pine the channeled spikes have about 60 per cent. of the holding power of screw spikes, and about 12 per cent. more holding power than the common spikes. Because of the channel in the channel spikes they distort the wood fiber less than the common kind. The right half of Fig. 2 shows that in loblolly pine the Illinois Central spike and the ordinary screw spike have practically the same holding power, as would be expected from their similarity in form. The force required to pull them is about double that required for common spikes.

The remaining three tables in the report give rise to the following conclusions: That seasoned ties have a greater holding power than steamed ties; that a knotty tie has about 25 per cent. less holding power for common spikes than a clear tie, but about 35 per cent. greater holding power for screw spikes, and that the holding power of a natural tie and one steamed for 4 hr. at 30 lb. pressure is about the same. Steaming for 4 hr. at less than 30 lb. appears to increase the holding power, while steaming for more than 4 hr. at 20 lb. decreases it. Ties steamed and creosoted or steamed and treated with zinc chloride appear to have less holding power than those simply steamed.

A Spanish Steel Syndicate.—On December 15, 1906, there was formed in Spain the Sindicato Siderurgico de Espana, with headquarters at Calle de Serano 25, Madrid, for a period of five years from January 1, 1907. At the beginning it will be a common sales agency for bars, beams, channels and plates. The following firms have joined: Altos Hornos de Vizcaya, Duro-Felguera, Sociedad Fabrica de Mieres, Sociedad Material para Ferrocarriles y Construcciones, Fabrica de Bidasoa, Purisima Concepcion, Compania Basconia, Fabrica San Francisco del Desierto, las Fabricas de Moreda y Gijon, Hijos de R. Garcia, Sociedad de Santa Ana de Bolueta and F. Echevarria e hijos.

The Productive Efficiency of Steel Works.*

BY JAMES WAITE, REDCAR, ENGLAND.

The efficiency of engines, motors and individual machines has been the subject of attention for years to the neglect of a broader and deeper question—namely, the productive efficiency of large works in general. Steel works may be considered as one great machine into which pig iron is charged at one end, and with a turn of the handle rails plates or sections are delivered at the other end. Each department must be treated as a member of the machine and not as an independent unit. To increase mechanical efficiency in any machine friction must be decreased. The principle holds good with steel works. The problem is how to discover, measure and overcome this friction.

Finishing Mill Capacity the Unit.

In steel works the primary unit of measurement is the theoretical capacity of the finishing mill. The maximum tonnage obtainable per shift per day or per week should be taken as the working basis, with allowance for roll changing, but regardless of choking up the delivery in front. Let it be assumed that the blast furnaces can produce not less than this amount and that the steel furnaces average 75 per cent.; casting, stripping and delivery arrangements and soaking pits, say, 75 per cent.; blooming mill, 100 per cent.; hot beds only about 60 per cent. without becoming choked up; straightening, drilling and shearing equipment, say, 50 per cent., and so on. From such data a diagram can be made showing at a glance the location and extent of the deficiencies. Then it would be possible by improving the hot bed, shearing and casting arrangements to change the diagram so that the working capacity of the steel furnaces would become the only deficient factor. It may be urged with truth that productive capacity may be mistaken for efficiency and that the former could easily be increased without increasing the latter. This is true, if the productive capacity of the whole plant is considered and without regard to friction, but where one department is considered in its relation to another a decline in the productive capacity of that department at once creates friction by setting up back pressure on the preceding department.

The question may be asked, Why do the steel furnaces in the assumed case give only 75 per cent. of the desired output? Possibly they are only charged with cold metal, or gas producers are deficient or the system of casting, stripping and delivery to soaking pits may be inefficient. In practice it is usually advisable to begin modification at the point of lowest efficiency and to note carefully what effect this improvement has upon other departments.

Plate Mill Practice.

Taking the case of a typical British plate mill: As soon as the plate is completed it is gripped and drawn forward on the hot floor, probably on the top of several others. When cool it is marked off for shearing and with the assistance of a winch and much exertion of the shearing gang it is raised to a buggy and laboriously dragged to the shears. When sheared, it has to be wheeled to the weighing table—often designed so that the plate must be temporarily removed from the buggy—and thence to the truck or stock floor. The process is inefficient, first and foremost because it is intermittent. The time required to bring the plate to the shears is almost as long as the time required to shear it. The shears are, therefore, only able to work at about half their true capacity, and the mill in turn has to be governed by the shears instead of governing them. A fair sized plate mill in Germany or America regularly yields 2500 tons per week, against 1200 tons by the above named system, solely because of higher efficiency, due first to the time saved by the process being continuous instead of only intermittent, and second, to the great reduction of "friction" at the shearing. A continuous stream of plates creeps slowly forward on a train of live roller gearing to the straighten-

ing mangles and the shears. The end of each plate enters the mouth of the shears, which is straight across the end of the live train, and is cut off. On leaving the live roller train and coming through the shears, the plate is supported upon a forest of castors, and is handled and sheared with a minimum of time, labor and physical effort. The enormous increase of output resulting is due to the alteration of one factor alone—the system of handling the mill product.

Most British plate mills have been built to deliver across the floor, through the shears, and into the truck, instead of along the floor. The system is fairly good so long as the plates are small and the quantity light, but with each increase in size and quantity the system has fallen more and more in efficiency. The fact of the mills being built to deliver broadside-on makes it more difficult to provide an efficient handling arrangement. Too much stress can scarcely be laid upon the importance of the relative position of one machine to another and one department to another. The ideal system is that of a straight line where the material goes on from process to process and machine to machine without turning to right or left, and above all without ever moving back.

Hot beds for rail or section mills should be as spacious as possible. Limited hot bed space has a twofold result, each a most serious evil. First, it controls the mill output like a small outlet on a large pipe; but worse, it necessitates the promiscuous piling of the material on the bed while still hot, and thus greatly increases the amount of final cold straightening, which is at best a slow and laborious process. The returning of material to be re-handled is a more serious matter than is usually considered, for in addition to the extra handling a back pressure is at once set up to the flow of the oncoming material. It is also to be remembered that these seemingly trifling losses usually occur in multiple, so that however negligible one may appear it is no indication of the result until the others are also known.

A Record of Defective Material.

One of the simplest and best methods of tracing the inefficiencies of a steel plant is that of making a daily or weekly record of defective and rejected material. The nature of the leading defects should be noted, and the finger could usually at once be laid on the source of trouble. The same system might be employed to great advantage with the running of the mill. Every stoppage should be noted, together with its cause.

The plant should be kept in a neat and orderly condition, so that no time may be lost in searching for mislaid material or in piling up material which would be shipped next week on the top of material which would be wanted to-morrow. The custom of accumulating pipes of scrap material, broken machinery, &c., is a bad one; it represents capital lying idle, and has a bad influence on the workmen.

Considerable time is lost through lack of shelter from the weather. There is also the loss due to inertia in restarting, both human and mechanical.

As a means of checking and comparing working costs diagrams should be used, not to take the place of the usual books and figures but for the sake of the effective and rapid bird's-eye view, showing the manager at a glance the points in need of immediate attention.

Doubtless much of the success and expansion of the steel industry in the United States and Germany is due to the attention paid to productive efficiency. In England the works run on similar lines, with a sound business organization, are invariably successful. Where high efficiency prevails the attention and energy of the management are not heavily drawn upon for manufacturing operations, but go to raise the efficiency still higher. But in an inefficient plant the staff must devote much time and energy to overcoming internal resistance to the flow of the product. The laying out of works advantageously for the progress of the product is of prime importance.

A. M. Castle & Co., Iron and steel jobbers, Chicago, have opened a branch office at 841 Monadnock Building, San Francisco, of which R. L. Sanford will have charge.

* An abstract of a paper read before the Cleveland, England, Institution of Engineers, December 10, 1906.

Applied Science in the Foundry.

William W. Hearne, Philadelphia partner in Matthew Addy & Co., read a paper on "Science in the Foundry," before Section D, Mechanical Science and Engineering of the American Association for the Advancement of Science meeting in New York December 28, 1906. At the outset the speaker referred to the conditions which had made a knowledge of the chemistry of pig iron more common in the foundry in recent years. Continuing, he said in part:

There are still furnaces in the country, notably in Virginia, that are run exclusively on their own local ores and local fuel. The foundryman who is able to obtain this iron does not need to have a laboratory, for he knows from experience exactly how it will work and how much of a certain character of scrap it will carry to make a certain kind of casting. These furnaces being comparatively small, and run with a low blast pressure, and the fact that the local ore and fuel are almost entirely free from sulphur, all help to make an ideal foundry iron.

An Example in Chemistry.

The chemistry of foundry practice is one of elimination, and this has been the cause of the almost limitless specifications. An experiment is made with iron running 2.50 per cent. in silicon, 0.80 per cent. in phosphorus, 0.035 per cent. in sulphur and 0.40 per cent. in manganese, and the experimenter discovers that he has made a satisfactory casting. Consequently when he wants an iron for this kind of work he demands iron of exactly this analysis, not knowing whether or not if he had iron with silicon, 2 per cent.; phosphorus, 1.10 per cent.; sulphur, 0.05 per cent., and manganese, 1.25 per cent., he would get the same result and possibly a much better and sounder casting, for the phosphorus is if anything a greater fluidizer than the silicon and the manganese promotes the removal of gases. When the second iron is melted he would lose at least one-third of the manganese, and with it would go the sulphur from his iron and possibly some picked up from his fuel. This will be especially true if he will tap his iron from the cupola into a big mixing ladle so as to give the manganese time to act.

The fact of the matter is that the foundry cupola is a very poor thing in which to make a mixture of iron, and very little reaction goes on there beyond the loss of a little silicon and the taking on of some sulphur. Besides, the slags of most cupolas are too acid, and much manganese is lost which ought to be carried forward into the mixing ladle, where it could be used to eliminate the sulphur. There is not nearly enough lime or fluorspar used by foundrymen. If the ordinary foundryman would introduce a little fluorspar in his molten iron he would be surprised at the amount of sulphur he would smell.

There are four things necessary for a good foundry mixture: Fluidity, soundness, softness and strength. How is fluidity to be attained? 1. By hot melting; 2. By the presence in the pig iron of carbon, silicon, phosphorus and manganese, and by freedom from sulphur. Practically pure iron is white and will not run at all, but melts into a sponge and burns before it will run. In ordinary foundry pig iron there is about 93 per cent. of metallic iron and about 7 per cent. of alloys, and it is the varying proportions of the different alloys that determine the character and grade of the iron.

The Disposal of Sulphur.

Sulphur is the most dangerous enemy of soft, sound castings, as it not only tends to combine the carbon, but by doing this causes the grain to close up quickly and to retain in little holes or sacks gases which might and should escape. These cause the casting to pit and to be porous. If iron can be kept fluid long enough the sulphur will all rise and pass off. This can easily be proved by drilling holes in any piece of iron of reasonable size poured in open sand. If three holes are drilled one above the other the proportion of sulphur in each set of drillings will vary as the height. This was demonstrated by Guy R. Johnson, in a series of 100 experiments. The problem, then, is to give the sulphur a chance to get away before it is locked in the casting.

There are many ways to do this, but the easiest and simplest is by using an iron carrying a fair percentage

of manganese and employing a large mixing ladle. In special cases it can also be done by putting into the mixing ladle a small amount of pulverized ferromanganese, or a small amount of fluorspar or of aluminum. Each of these will cause the iron in the ladle to boil, and during this boiling the sulphur will be thrown off and, as your molder will say, the iron is cleaned. Being free from sulphur your casting will be soft, as it will have the proper proportion of graphitic carbon. Most of the so-called patent fluxes for making semisteel castings are nothing but pulverized ferromanganese, fluorspar, or high ferrosilicons. Every foundryman can obtain these himself and make his own fluxes.

There is a brand of iron made in Virginia out of ores mined on the property, smelted with coke made by the same company, that demonstrates the futility of grading pig iron by silicon and sulphur alone. A certain foundryman took three irons. The first was made in western Alabama, analyzing: 3.25 per cent. silicon, 0.90 per cent. phosphorus, and 0.05 per cent. sulphur. The second was from Birmingham, and analyzed about the same as the above, except that the phosphorus was about 0.75. The Virginia iron analyzed: Silicon, 1.50 per cent.; phosphorus, 1.15 per cent.; manganese, 1.00 per cent., and sulphur, 0.005 per cent.

The three irons were melted under identical circumstances and were poured into molds 1 in. wide, $\frac{1}{4}$ in. thick and 14 in. long. This was for a fluidity test. The first iron filled the mold for $9\frac{1}{4}$ in., the second for $8\frac{1}{2}$ in., the third for 14 in., and the foundryman said he thought if he could have got the end of the mold out quickly enough it would have run to the end of the shop. This, of course was an enthusiastic exaggeration, but the test settled in that foundryman's mind the fact that phosphorus and manganese are elements that affect the fluidity of iron fully as much as silicon; also that an iron that had this fluidity must also be low in sulphur. The product of this furnace is used almost entirely by foundries making steam, gas and air cylinders, ammonia valves and other castings which need to be dense and free from pin holes and yet soft enough to be reamed and cut.

The Protective Tariff League and a Dual Tariff.

The American Protective Tariff League in its yearly meeting, January 24, at 339 Broadway, New York, unanimously adopted resolutions to be forwarded to the President and Congress, as follows:

Whereas, The American Protective Tariff League has always stood and now stands for a tariff on imports which shall adequately secure American industrial products against the competition of foreign labor; and

Whereas, A dual tariff has been agitated and recommended by many organizations; be it

Resolved, That the American Protective Tariff League favors a dual tariff, provided that the minimum tariff upon foreign products shall at all times fully represent the difference in cost of production; and

Resolved, That the maximum tariff shall be levied upon the products of all nations which discriminate against the exports of the United States.

The yearly election resulted in the choice of Charles A. Moore as president; William F. Draper, first vice-president; John E. Reyburn, second vice-president; Wilbur F. Wakeman, treasurer and general secretary. William Barbour of New Jersey, A. D. Juilliard of New York, David L. Einstein of New York, Lyman B. Goff of Rhode Island and Charles E. Coffin of Maryland were selected as the Executive Committee. The following were chosen members of the Board of Managers: J. F. Hanson of Georgia, Charles A. Moore of New York, William Barbour of New Jersey, Theodore Justice of Pennsylvania, Charles E. Coffin of Maryland and R. G. Wagner of Wisconsin.

Wilbur F. Wakeman, treasurer and general secretary, in his report of the general operation of the league in 1906, showed the receipts were \$55,348.57; disbursements, \$55,099.48; balance, \$2,249.09. The league had a membership of 966 at the end of the year, an increase of 101 over 1905. The press service has extended to 5510 newspapers. Nine new publications were issued in the year and protection documents with a total of 64,867,641 pages were distributed.

Niagara Power Regulation.

Secretary of War William H. Taft has granted four permits that will allow the importation and transmission of 160,000 electrical horsepower from Canada to the United States at Niagara Falls and locality. These permits and decision come following the extended and thorough hearing held by the Secretary in Washington. He finds that the development of power contemplated at Niagara will not mar the scenic beauty of the Falls of Niagara, and that the permits to transmit 160,000 hp. from Canada to the United States can be safely granted.

The Ontario Power Company is given a permit to transmit 60,000 hp. This company asked for 90,000 hp., and it will deliver its power to the Niagara, Lockport & Ontario Power Company, which latter company has already constructed a transmission line 157 miles, or from the Falls to Syracuse.

The Canadian Niagara Power Company is given a permit for 52,500 hp., whereas it asked for 121,500 hp. It will deliver its power to the Niagara Falls Power Company, with which company it is allied. This company has a transmission line crossing the river over the upper steel arch bridge at Niagara Falls and another line crossing the Niagara River between Fort Erie and Buffalo. On the Canadian side the Canadian Niagara Power Company has built a transmission line from the Falls to Fort Erie, and on the New York side the Niagara Falls Power Company has two transmission pole lines carrying three three-phase systems.

The Electrical Development Company of Ontario is given a permit to transmit 46,000 hp. across the border. This company has connections with the Toronto & Niagara Power Company on the Canadian side, and this latter company has a transmission line to Toronto. The Electrical Development Company is also allied to the Niagara Falls Transmission Company, which company is to act as the distributing agent on the New York side of the river.

Preserving the Scenic Beauty.

The object of the act as stated by the Secretary is to preserve the scenic beauty of Niagara Falls. He concedes it within its power to impose conditions upon the granting of these permits, compliance with which will remedy the unsightly appearance on the American side of the cañon just below the falls, where the tunnel of the Niagara Falls Power Company discharges and where the works of the Niagara Falls Hydraulic Power & Mfg. Company are placed. To assist him the Secretary will appoint Charles F. McKim, Frank D. Millet and F. L. Olmstead as a committee to advise what changes can be made at an expense not out of proportion to the extent of the investments, which will put the side of the cañon at this point from bottom to top in natural harmony with the falls and the other surroundings, and will conceal as far as possible the raw commercial aspect that now offends the eye.

Taking up the applications for permits for diversion on the American side, the Secretary states there is no room for discussion or difference. The Niagara Falls Power Company is now using about 8600 cu. ft. of water a second and producing about 76,630 hp. There is some question as to the necessity for using some water for sluicing. This must be obtained from the 8600 cu. ft. permitted, and the use of the water for other purposes when sluicing is being done must be diminished. The Niagara Falls Hydraulic Power & Mfg. Company is now using 4000 cu. ft. of water per second, and has had under construction for a long period, antedating the Burton act, a plant arranged to divert 2500 cu. ft. per second and furnish 36,000 hp. to the Pittsburgh Reduction Company (now the Aluminum Company of America). The Secretary therefore issues a permit to the Niagara Falls Hydraulic Power & Mfg. Company for the diversion of 6500 cu. sec. ft., the same rule to apply to sluicing as already stated.

In conclusion, in considering a report that the transmission companies intend to combine, the Secretary says that if evidence of the existence of such a combination

should be brought before him it will be given careful consideration as a ground for the modification now taken.

It is understood that the three companies that contemplate the transmission of Canadian power into the United States are fairly well satisfied with the permits. It is reasonable to suppose that each would have enjoyed a larger allotment of power. The 1500 hp. allowed to the International Railway Company will be held awaiting the decision of the Canadian Government in a controversy between that company and the Victoria Park Commissioners.

The additional 2500 cu. sec. ft. awarded to the Niagara Falls Hydraulic Power & Mfg. Company will allow sufficient diversion to supply its magnificent new power house now in course of erection. It will be from this new power station that the new plant of the Aluminum Company of America will be supplied with power. This new power house is to be located at the water's edge in the Niagara gorge, while the new aluminum plant is being built on top of the high bank.

Foundrymen Appeal to the Interstate Commission.

At a meeting of the New England Foundrymen's Association held in Boston January 9, a Committee of Five was appointed to investigate the matter of alleged discrimination in freight rates as applied to Southern pig iron. This committee held its first meeting in Boston January 24, and adopted the following telegraphic appeal to the Interstate Commerce Commission:

"We request that you suspend action of the Southern railroads in putting into effect the tariff on pig iron effective February 1, for at least 60 days, or until foundrymen have an opportunity of entering a protest and arranging for a hearing before your honorable commission. Henry A. Carpenter, chairman, A. Carpenter & Sons Foundry Company, Providence, R. I.; B. M. Shaw, Walker-Pratt Mfg. Company, Boston, Mass.; Arthur W. Gibby, Gibby Foundry Company, East Boston, Mass.; Geo. H. Lincoln, Geo. H. Lincoln & Co., South Boston, Mass.; Fred F. Stockwell, Barbour-Stockwell Company, Cambridge, Mass."

The telegram was followed by a letter from the committee, which says:

"The foundrymen of New England feel that the proposed advance scheduled to take effect February 1, 1907, is unjust and uncalled for. At the present time we believe it to be a fact that there are over 100,000 tons of iron that was bought by foundrymen to be delivered before the time set for advance, and that the railroads up to the present time have been unable to deliver iron now on hand at the furnaces, and that if the proposed advance does take effect it will work severe hardship on all foundrymen in the North. We would suggest that you advise us of your action in this matter and beg to suggest that a fixed and permanent rate be adopted which will be equitable to all interested parties. If it is necessary for you to hold a hearing on this matter, our association would be pleased to send a representative to appear before you."

A cablegram from London, dated January 21, states that the report of the purchase of a number of tin mines in Cornwall by an American syndicate is confirmed. The syndicate, it is announced, is one of the strongest financial groups in the United States, and proposes to expend at least \$5,000,000 on the venture. The syndicate will establish central smelting works for all the mines under its control, and use Penzance as a port for shipment. It has been the custom hitherto for all mining companies in Cornwall to sell their ore to smelters.

A large deposit of magnesite has been discovered at Seboek, Komitat Gomor, Hungary. The Ochtina-Seboek Gewerkschaft has been organized, with headquarters at Magdeburg, Germany, to develop the deposit and build plant. The head of the undertaking is F. O. Eichler of Magdeburg.

Trade Publications.

Drills.—Bickford Drill & Tool Company, Cincinnati, Ohio. Catalogue. Size 6 x 9 in.; pages 41. This is the company's radial drill catalogue, describing and illustrating the complete line of radial drills, which are furnished with either belt or direct drive. Among these is the new pattern built in 2½, 3 and 3½ ft. sizes, which was described in *The Iron Age*, October 11, 1906. The catalogue gives dimensions and specifications of all the standard sizes manufactured and options in bases, tables, attachments, &c.

Wood Planing Machines.—Barter D. Whitney & Son, Winchenden, Mass. Catalogue. Size 5½ x 8 in.; pages 24. Describes and illustrates the Whitney single and double surfacers, which can be belted from above or below the floor level, and also scraping machines, molding machines, back knife gauge lathes and patent barrel stave sawing machines. A table of dimensions, weights and speeds is given of the single and double surface planers.

Couplings.—The Anderson Coupling Company, Portland, Conn. Catalogue. Size 5 x 8¼ in.; pages 27. Deals with Anderson patent lead pipe couplings, corporation stops and curb cocks and other special pipe fittings, including renewable brass gate valves of the retaining ring construction and gauge construction.

Rock Drills.—Ingersoll-Rand Company, 11 Broadway, New York. Catalogue No. 45 B. Size 6 x 9 in.; pages 96. This book, besides containing a detailed description of these machines, gives tabulated specifications and capacities of each type and size, with comments on the work for which each is adapted. Drill mounting of every style and rock drill accessories are also listed. A list of 44 questions covering the problems of rock drilling under all conditions is given. A feature of value to the user of drills is the section giving illustrated part lists of every appliance described, with instructions for ordering. Several pages devoted to tables of useful information on compressed air conclude the contents of the book.

Machinery.—Holt Mfg. Company, Incorporated, Stockton, Cal. Catalogue. Size 6½ x 10 in.; pages 48. Describes and illustrates the traction engine outfits, harvesters, &c., manufactured by the company. Dimensions, weights, &c., of the traction engines and combined harvesters are given in a tabular form. A reprint from the Stockton *Daily Evening Record* descriptive of these harvesters, traction engines and scrapers is included.

Electrical Apparatus.—General Electric Company, Schenectady, N. Y. G. E. specialties catalogue No. 3463. Size 3¼ x 6¼ in.; pages 345. This catalogue is being distributed to assist purchasers in placing orders for incandescent lamp sockets and receptacles, attaching plugs, switches, cutouts, fuses and general wiring appliances. As a rule each page contains only catalogue numbers and brief descriptions necessary to identify apparatus, and it is intended that for general descriptions the user will refer to the company's publications devoted to the various lines of supplies. Code words are given and a detachable price-list section is bound separately in the book.

Dynamos and Motors.—Northern Electrical Mfg. Company, Madison, Wis. Bulletin No. 50A, superseding spherical machine sections of bulletins 46 and 35. Deals with Northern spherical motors, single voltage variable speed motors, back geared motors, vertical motors, universal motors and direct current apparatus. Illustrations show applications of motors to the driving of machine tools and generators direct connected to prime movers.

Grab Bucket Hoists.—Sprague Electric Company, New York City. Loose leaf for insertion in catalogue; pages 220—12 G and 12 H. Illustrates a monorail hoist with grab bucket for handling coal, ashes, &c., which is claimed to have many advantages over the old system of drums and friction clutches.

Pulleys.—Latshaw Pressed Steel & Pulley Company, Pittsburgh, Pa. Folder. Describes the Latshaw steel split pulleys, for which the main advantages claimed are that they are safe under high speeds, grip the shaft perfectly, are bushed to fit shafts of all sizes, and can be applied without stripping the shaft. They are double belt pulleys and are made in 6, 8, 12 and 16 arm patterns in diameters from 12 to 50 in., and face widths of 3 to 24 in. A description of these pulleys appeared in *The Iron Age* August 30, 1906.

Boilers.—D. Ahern, 263 South street, New York City. Catalogue B. Pertains to the D. Ahern boilers for house heating and other purposes. Half-tones and line drawings show the construction and principle of operation by virtue of which an excellent fuel economy is claimed.

Steam Specialties.—Strong, Carlisle & Hammond Company, 336 Frankfort avenue, N. W., Cleveland, Ohio. Catalogue. Size 6 x 9 in.; pages 31. Illustrates and describes the Squires steam specialties, including steam traps, reducing valves, pump governors and feed water controllers, the construction and operation of which is very clearly brought out.

Small Generators.—Crocker-Wheeler Company, Ampere, N. J. Bulletin No. 69. Describes a small generator specially arranged for direct connection to steam or gas engines, and built in sizes to give outputs of 1½ kw. to 19 kw. and meet

the demand for small units for isolated plants and residences. It is a design slightly modified from the form I motor which has been manufactured for some time.

Lathes.—Fay & Scott, Dexter, Maine. Catalogue No. 12. Size 6 x 9 in.; pages 36. Shows the company's line of standard engine lathes built in 14, 16, 18, 20, 24, 28, 32 and 38 in. sizes, and carriage turrets, turret chucking lathes, universal turret lathes and special taper turning lathes. A dimension sheet of the standard engine lathes is given and a telegraph and cable code is appended.

Machine Tools and Supplies.—Scully Steel & Iron Company, Halsted and Fulton streets, Chicago, Ill. Stock list for January and February, 1907. Size 4½ x 7 in.; pages 144. This latest edition of the regularly published stock list covers a large variety of stock, such as steel plates and sheets, shafting, tubing, rivets, boiler parts, bolts and nuts, bar iron, structural shapes, wire rope, and machines and tools such as are used in forge shops and by iron workers. It contains an index to the reading matter and also various price-lists and tables of weights and dimensions. A page of useful information is appended.

Mining and Quarry Cars.—Allis-Chalmers Company, Chicago, Ill. Catalogue No. 17, sixth edition. Describes and illustrates standard mining cars, automatic ore cars, scoop ore cars, Anaconda car axles, ore buckets, water buckets and automatic dumping cars.

Pyrometers.—Edward Brown & Son, 311 Walnut street, Philadelphia, Pa. Catalogue. Deals with a line of pyrometers and scientific instruments, including pyrometers of the hot blast, Brown recording, quick acting, platinum, water current, Le Chatelier electrical, standard portable, Siemens water, Hobson hot blast, Ferry radiation, Uehling pneumatic and electrical resistance types, and also with revolution indicators and gauges. Testimonials and a list of users of these pyrometers is given.

Lathes.—Cincinnati Lathe & Tool Company, Cincinnati, Ohio. Circular. Concerns the Cincinnati 16-in. instantaneous change gear engine lathe, which is equipped with a compound rest and a W. T. Emmes' patent feed device, with three-step cone and double back gear. This lathe was described in *The Iron Age* July 5, 1906.

Quartz Mills.—Allis-Chalmers Company, Chicago, Ill. Catalogue No. 10, seventh edition. Size 6 x 9 in.; pages 43. Pertains to the 5 and 6 ft. improved Huntington mills for gold ores and for concentration. Specifications of these and instructions for erecting and operating a Huntington mill plant are given. Brief descriptions of the Gates rock and ore breakers, Blake ore crushers, Dodge crushers, Frue vanners, Overstrom concentrators and Challenge ore feeders are also included.

Flexible Electric Lamp Fixtures.—T. R. Almond Mfg. Company, 83 Washington street, Brooklyn, N. Y. Pamphlet. Deals with Almond flexible arms for electric lamps, which allow the bulb to be adjusted so that the light may be directed and concentrated where desired. Illustrations show a few of the innumerable ways in which the holders may be used to advantage.

Governors.—Lombard-Replogle Engineering Company, Akron, Ohio. Bulletin A. Contains an illustrated account of the principles and operation of the Lombard-Replogle water wheel governor, an apparatus combining the experience of two heretofore independent designers, Nathaniel Lombard and Mark A. Replogle. Three different sizes are now ready for the market.

Pumps.—Union Steam Pump Company, Battle Creek, Mich. Miniature catalogue. Principally composed of illustrations showing Burnham pumps of steam, belt and motor driven types for boiler feeding, mine and house supply, &c. A few reading pages deal with general principles and particularly emphasize the claim that Burnham steam pumps will not short-stroke.

Laboratory Specialties.—Sturtevant Mill Company, Harrison Square, Boston, Mass. Pamphlet. Refers briefly to special laboratory machinery, such as crushers, rolls, sample grinders, screens, breakers, fine crushers and crushing rolls. Engravings from photographs give exterior views of each machine and also show it open for cleaning.

Asbestos Packings.—H. W. Johns-Manville Company, 100 William street, New York. Catalogue No. 101. Size 4½ x 7 in.; pages 78. This lists the company's line of "J-M" asbestos packings, and is divided into five sections. These deal respectively with the various kinds of "J-M" sheet packings, gaskets, ring packings, spiral and coil packings and packing specialties. A circular now being distributed is entitled "How to Pack Gas Engine Cylinder Heads."

Ventilators.—Burt Mfg. Company, Akron, Ohio. Pamphlet. Describes and illustrates the glass and metal top ventilators, for factories, boiler and power houses, residences, &c. An illustration shows a 48-in. glass top ventilator supporting 11 men with a total weight of 1762 lb. A partial list of users is appended.

Concrete Mixers.—Cook Mfg. Company, Albion, Mich. Circular. This deals with portable concrete mixing outfits of the open and housed types, giving illustrations of both. For power the company's 2½-hp. gas or gasoline engines are used. The portable hand mixers have a capacity of from 30 to 40 yards for eight hours' work, and the power mixers of from 35 to 60 yards in the same time.

is the text of the sermon. Regrettably it will have little effect because the evil is widespread and deep rooted, and like weeds not to be eliminated by cutting down. Suggestions are made in the following that aim at the roots.

The idea that trade literature should be mailed under letter postage is not new. Many have tried it, but they usually forget the attitude of the man whose attention has been compelled by this subterfuge (it is practically that). At the busiest period in the day, when he opens his mail, will he not be irritated by having forced upon him something he is not interested in at the time, and instantly destroy it? This rule might be safer: Never use letter postage unless the catalogue, circular or what not is certain to be of timely interest, and presents its subject matter concisely and completely. Otherwise let it go undisguised—let it be just what it represents and nothing more. It will cost just half as much to mail it, and no one thinks less of a concern that is businesslike, even to getting Uncle Sam's service at minimum cost. It may quite reasonably be taken to reflect equal attention to economies in shop and office system that mean the customer will get the most for his money.

In general a vast amount of trade literature is wasted. Much is advertised in that way which does not deserve it, or does not need it. More is not thoughtfully prepared. The mistake of employing incompetent persons to compile trade publications has been referred to in these columns before, and will not be dwelt upon now. In brief, be it said: Quality counts more than quantity—better a few catalogues or pamphlets that are worth preserving than a lot of miscellaneous cheap circulars that are foreordained for the waste basket without more than a glance. Standard sizes are desirable. They are more likely to be placed in the catalogue file now found in every progressive office. Good printing and good engravings, that tell the story, artistically if possible, but not extravagantly so, are their own justification. Finally, not a little trade literature is wasted because it is distributed promiscuously. This is particularly a shame when the catalogue worthily presents a worthy subject. All sides are to be congratulated that so many publishers of trade literature now use selected mailing lists. It saves them expense and others time.

Reduced to its lowest terms, if you would command a man's attention to your product do it through a medium he himself invites—in other words, advertise in a standard periodical that he cares enough about to keep by him. It economizes the busy man's time, and that appeals to him. When one is intending to purchase some new piece of equipment it is much easier to locate manufacturers through the technical and trade papers than to look over a raft of miscellaneous catalogues, pamphlets, &c. Having selected those considered the best in the field it is time to write for catalogues. When each firm complies with the request it does so with some prospect of your order, and is not wasting money and time in flooding others with matter not likely to interest them. In exceptional cases a man's attention may be drawn in that way to a need he did not realize. If the product is such it may pay to distribute circulars broadcast, but more probably it will prove an inefficient business getting campaign. A management that watches the operation of its plant keenly to attain and maintain the greatest economy is inconsistent when it throws away a lot of printed matter that cost time and thought to prepare, money to illustrate and print and more money and time to distribute. Yet this is done every day and repeatedly by those in other respects examples of business wisdom. The rational place for the subject matter of

flyers not meant to be kept is the advertising pages of the trade papers.

When trade literature ceases to be so much waste paper it will be welcomed and accorded attention. Present conditions incline all large companies to destroy without examining their third-class matter. Although they should have a competent person pass upon it, failure to do so may be justified while there is small reward in separating the grain from the chaff.

Side by side with the *Silent Partner's* golden rule for printed matter place this beatitude, "Blessed are they that issue good trade literature, for theirs shall be read."

Growing Imports of Ferromanganese.

Statistics of imports of the manganese metals are so belated that they lose much of their interest. The market on these metals, however, is so uncertain that the smallest modicum of light should be welcomed. It is possible at this time to present the statistics of imports in the quarter ending September 30, 1906. On September 20 we gave the statistics through June 30, but the printed report containing those statistics will not be issued until early in March.

The imports of ferromanganese and spiegeleisen in the quarter ended September 30, 1906, were in excess of those of any recent quarter, and probably of any quarter in all time. Reducing the spiegeleisen approximately to ferromanganese equivalent, the imports of manganese showed an increase of more than 16 per cent. over the previous quarter, and of 50 per cent. over the quarter preceding that. Indeed, the imports in the three quarters ending with September, 1906, greatly exceed the imports in any previous fiscal year excepting 1903.

The imports in the quarter ended September 30, 1906, compare as follows with the four preceding quarters and with 1900 and the six succeeding fiscal years. The total ferromanganese equivalent is computed roughly by assuming 4 tons of spiegeleisen to equal 1 ton of ferromanganese:

Imports of Ferromanganese and Spiegeleisen for Consumption.
—Gross Tons.

	Ferromanganese.	Spiegel.	Total in terms of ferromanganese.
Year ending June 30, 1900....	10,684	13,615	14,088
Year ending June 30, 1901....	8,995	16,308	13,072
Year ending June 30, 1902....	37,618	31,416	45,472
Year ending June 30, 1903....	53,121	122,566	83,762
Year ending June 30, 1904....	23,903	50,620	36,558
Year ending June 30, 1905....	41,166	22,443	46,777
Year ending June 30, 1906....	62,065	71,594	79,964
Third quarter, 1905.....	13,813	4,836	14,522
Fourth quarter, 1905.....	12,910	12,924	16,141
First quarter, 1906.....	14,622	27,255	21,436
Second quarter, 1906.....	21,220	26,579	27,865
Third quarter, 1906.....	24,914	29,843	32,375

Statistics of domestic production of ferromanganese and spiegeleisen show that in general there has been a moderate increase for some time. The year 1903 was an exception, as it showed a great drop in domestic production. It will be noticed that imports in the fiscal year 1903 were abnormally large. It may be taken, then, that the imports are a fairly accurate index of the increase in consumption. Taking the two middle quarters of 1906 as a criterion, our imports are running at the rate of about 120,000 tons a year of ferromanganese equivalent, while our production in 1905, still reckoning 4 tons of spiegel as equivalent to 1 ton of ferro, was at the same rate. Our present consumption is probably at the rate of more than 250,000 tons a year. In 1902 the consumption was running at the rate of about 150,000 tons a year.

While these are only approximate figures, it may be taken that they show an increase in consumption of more than 60 per cent. from 1902 to 1906. The increase in steel production in the same period was only between 40 and 45 per cent., and this disparity bears out the general understanding that the increase in consumption of the manganese metals has been due in a measure to the rise of steel castings and of special steels, many of which involve a much larger manganese content than does ordinary soft steel. Indeed, it is pretty certain that the consumption of manganese, per ton of soft steel produced, has not increased, if it has changed at all.

As ferromanganese and spiegeleisen are dutiable as ordinary pig iron at the specific rate of \$4 a ton, the declared values should command more respect than such values do in some other cases, while average values per ton are more indicative of costs than averages obtained from current quotations, which do not allow for the great variation in tonnages bought and sold in different periods. The average declared values per ton of imported ferromanganese at the port of shipment have been as follows:

Imports of Ferromanganese and Declared Values.		
	Imports. Tons.	Value per ton.
Fiscal year 1899.....	10,392	\$38.04
Fiscal year 1900.....	10,685	48.48
Fiscal year 1901.....	8,995	50.77
Fiscal year 1902.....	37,618	36.45
Fiscal year 1903.....	53,121	39.59
Fiscal year 1904.....	23,903	38.85
Fiscal year 1905.....	41,166	32.57
Third quarter, 1905.....	13,313	37.28
Fourth quarter, 1905.....	12,910	39.24
First quarter, 1906.....	14,622	50.05
Second quarter, 1906.....	21,230	60.81
Third quarter, 1906.....	24,914	57.91

It will be observed that these prices do not show the heavy advance which occurred in the domestic market for small and moderate sized lots a year ago. Some of the merchants were probably realizing large profits on a small part of their business at that time.

The Lessening Number of Unfit Furnaces.

That the list of active blast furnaces in the United States is now at the highest figure in many years is the joint result of a continuous campaign of furnace building and of the maintenance of pig iron prices for some months well above the cost line of stacks of the less fit type. There has not been in the past year the phenomenon sometimes seen when producing capacity is put under pressure—the swinging into line of a fresh set of furnaces as each successive advance of \$1 more per ton was established. Inability to get raw materials, an inability in which even companies owning their own iron and coal mines shared, has hobbled the blast furnace interests of the country for months. The fact is that blast furnaces that have not kept up with the movement of the past six or eight years by the expenditure of money for new equipment and increased capacity are now to be regarded as practically out of the race. Reconstruction and the building of new furnaces has gone on steadily, until the percentage of stacks that can only run in the brief intervals of \$18 and \$20 iron is smaller than ever.

Of the 380 coke and anthracite furnaces figuring in the monthly statistics of *The Iron Age* 320 were in blast on January 1, and of the remainder, 28 that had been in blast for some portion of 1906 were out for repairs. This would leave but 32 furnaces, or 10 per cent. of the total number, though much less than that percentage of the total capacity. These are not all to be treated as ineligible, for a few of them are now being prepared for blast and some others are alternate stacks. In the past

two months several furnaces long idle have been restored to the producing column, famine prices or early delivery iron having at length proved a temptation, prevailing even against the embargo imposed by transportation and raw material difficulties.

The difference between conditions on January 1, 1907, and January 1, 1904, is brought out sharply in the following comparison of figures representing coke and anthracite blast furnaces active:

	Furnaces.	Weekly capacity. Tons.
January 1, 1907.....	320	507,397
January 1, 1904.....	153	185,636
Increase.....	167	321,761

The three years' interval thus brought 110 per cent. increase in number of furnaces in blast and 174 per cent. increase in weekly capacity. The new 500-ton furnaces blown in in the past three years show plainly in the figures in the increase in average capacity. From being 1213 tons a week on January 1, 1904, it had grown to 1586 tons a week at the opening of the present year. Taking a five-year interval, the difference becomes more pronounced, the average weekly capacity of the 264 coke and anthracite furnaces in blast January 1, 1902, being 1130 tons. It forcibly illustrates the new order in the blast furnace industry when a maximum number of active furnaces is accompanied by so large a weekly output per furnace. In the old days an unusual number of active furnaces was inevitably accompanied by a pronounced shrinkage in average yield.

Fire Handling at the Baldwin Locomotive Works.

The December report of fires and losses issued by the Boston Manufacturers' Mutual Life Insurance Company includes the fire department report for 1906 of the Baldwin Locomotive Works, Philadelphia. The fire department at these works has 162 members, and the equipment consists of the following: Seven fire pumps, seven hose carts, 13,000 ft. of 2½-in. rubber-lined hose, 164 fire extinguishers, 170 iron fire tubs, 828 fire buckets, 100 hose reels, 110 metal play pipes, 1 three-way high pressure fire plug, and two alarm signal boxes, also one striking signal box. The statement as to the causes of fires in 1906, and their handling, is interesting as showing the liability to fires in works of such extent and character, and the efficient means for coping with them where a works fire department is properly organized and drilled. The 95 fires reported for last year were an increase of five over the number for 1905. The causes were as follows:

Sparks from cupola.....	9	Heat from boilers.....	2
Sparks from locomotive....	6	Electric motors.....	3
Sparks from furnaces.....	2	Electric wires.....	9
Sparks from rivet forges... 5		Molten iron.....	1
Sparks from electric motors 3		Lighted torches.....	5
Switchboards.....	2	Lighted matches.....	3
Spontaneous combustion... 8		Crane motor.....	1
Shell fires.....	2	Grease in furnace flue.... 1	
Welding forge.....	1	Burning rubbish.....	1
Hot coals from rivet forges. 8		Furnace flue.....	1
Oil dripping from oil engines 1		Hot rivets.....	5
Hot ashes.....	6	Hot boiler plates.....	2
Hot boxes.....	2	Gas from vaporizing chamber 1	
Hot stove.....	2	Unknown.....	2

Nineteen fires were extinguished with water lines from pumps, 29 with fire extinguishers, 46 with buckets of water, and 1 with bar sand. On two occasions an alarm was turned in for the Philadelphia department, but their services were not required, as the shop men had the fire under control.

Frank B. Pope, Diamond Bank Building, Pittsburgh, has taken the agency for the sale of the Osceola brand of silica brick, made by the Osceola Silica & Fire Brick Company, Osceola Mills, Pa.

The Warwick Iron & Steel Company.

The annual report of the Warwick Iron & Steel Company, Pottstown, Pa., which we print below, is a particularly interesting document because it deals with a leader of a type of fairly numerous merchant furnaces in the East, who are converters of raw material pure and simple, and place their product in the open market, without any ownership of sources of supply of materials and without any direct affiliation with consuming interests. The management of the Warwick Iron & Steel Company has therefore clearly realized the necessity of keeping the plant up to date and was the first upon the recommendation of Edgar S. Cook, the president and one of the leading furnace managers in the country, to install the Gayley dry air blast. There has been recently a movement among some of the stockholders, not familiar with the iron industry, against the expenditures which such improvements involve, on the ground that they prevent a larger distribution of dividends. In the light of these developments the report will be read with particular interest:

"The total product of pig iron for 1906 was divided as follows: No. 1 furnace, 52,868 gross tons; No. 2 furnace, 165,548 tons; No. 3 furnace, 10 days' product, 1365 tons; total, 219,781 tons.

"The total product of No. 1 and No. 2 furnaces for 1906 compares as follows with previous years: 1906, 218,416 tons; 1905, 205,788½ tons; 1904, 125,933 tons, with No. 2 furnace out of blast for four months; 1903, 173,115½ tons.

"The growth of product from the same furnaces illustrates the benefits derived from the betterments and improvements heretofore made, and also the necessity for the increased facilities, both mechanical and financial, to enable us to handle the increased tonnages of raw material necessary to produce the larger product of iron, as well as the handling of the iron itself. The large product helped to reduce the cost of iron per ton for 1906.

"No. 1 and No. 2 furnaces were operated throughout the entire year with only temporary stoppages, brought about by floods, accidents to machinery, &c. As far as possible, with the furnaces in operation, they have been kept in a good state of repair. The furnace known as No. 3 furnace was leased from the Glasgow Iron Company September 28, 1906, with the approval of the Pottstown Iron Company, the owner, for a term of 14 years. There is no obligation to operate this furnace continuously. The money expended on repairs to December 31 was \$74,319.37. The terms of the lease call for the payment of one-third of the cost of repairs by the Glasgow Iron Company, which one-third, while advanced by our company, will be repaid by the Glasgow Iron Company out of the rental as it accrues monthly. This lease can now be sold, subject to the approval of the Glasgow Iron Company, as per terms of lease, for considerably more than we have expended upon the repairs. Patented grates, enabling us to substitute low priced grades of coal and also to use the coke screenings, heretofore chiefly a waste product, were applied to all the boilers of our No. 2 furnace, at a cost of \$4913. A large part of this expenditure has already been returned to us through the saving in cost of boiler fuel as compared with 1905 and previous years. The Schuylkill River bridge, connecting the furnace plant with a farm on the opposite side of the river, has been completed at a cost of \$37,221.40 and is now being used to enable us to dump slag. This bridge was completed just in time to prevent serious embarrassment in the disposal of slag made by No. 1 and No. 2 furnaces. For 1907 and subsequent years the old slag bank will be a source of revenue. The lessee has crushers and machinery in position to commence operations next spring. Other expenditures were for a new steam crane, costing \$5475, and a new trestle track costing \$4186.64. The trestles were needed to provide storage for a lot of foreign ore. The difference in the price of this ore for 1906 delivery, as compared with the price per ton of the same ore for 1907 delivery, as per contract entered into, more than paid for the trestles.

"The Gayley dry air plant, authorized by unanimous decision of the Board of Directors April, 1906, is now in process of erection and some portions of the machinery have been delivered. The expenditures to December 31 show a total of \$71,205.12. The total cost was estimated at about \$230,000, including the license.

"Present and prospective values of raw material indicate a higher cost of manufacture than has existed for many years. This is especially true of iron ores, and of coke and coal also, but possibly to a lesser degree. Unless new sources of ore supply are discovered and rendered available the ore cost will tend to increase rather than decrease. Under these conditions, beyond our control, the only hope of increasing the spread between the cost of iron and the selling price, or the net profit per ton on iron, is to reduce the cost of converting raw material into pig iron. The quickest and least costly method of accomplishing this desirable and necessary end, after most careful and thorough consideration, was the Gayley dry air process, and through its adoption to protect our net profits under competitive conditions with furnaces owning raw material, either ore or coke. It is expected that the use of air of uniform moisture contents and with a low percentage of moisture throughout the year will so reduce the cost of converting raw materials into pig iron as to more than justify the cost of installation. We hope to have the plant in operation by May or June next. This installation, as well as No. 3 furnace, will undoubtedly add to the value of our property as a whole.

"The book value of the stock per share, as of December 31, is about \$14.86.

"During the year \$15,000 of the bonds were paid, leaving the outstanding issue \$240,000. These bonds as a first mortgage represent but a trifling lien on the valuable property of the company. They, however, cannot be retired until 1911. A second mortgage, to provide for the cost of the Gayley dry air plant and No. 3 furnace, could not have been negotiated on advantageous terms, if at all, so that the utilization of our earnings and of our credit in shape of bank loans were the only resource.

"The net earnings for the year amount to \$293,243.10, equivalent to an average profit of about \$1.33 per ton, as compared with 71 7-10 cents per ton for 1905.

"The prospects now are that if all of our three furnaces can be kept in successful operation during 1907 our earnings will be sufficient not only to pay dividends, but also to reduce our loans to such an extent that they will no longer demand any serious consideration."

The condensed balance sheet of the company as of December 31, 1906, is annexed:

Assets.	
Real estate, plant and equipment.....	\$1,782,862.42
Pig iron on hand.....	11,878.23
General stock at furnace (duplicate parts, &c.)..	24,275.16
Bills receivable, notes for pig iron.....	10,619.91
Cash in bank.....	111,091.65
Materials on hand, ore, coke, &c.....	526,507.81
Dry air plant.....	71,205.12
No. 3 furnace.....	74,319.37
Accounts receivable, shipments of pig iron.....	432,776.88
Total	\$3,045,536.55
Liabilities.	
Capital stock.....	\$1,486,715.00
Mortgage bonds.....	240,000.00
Profit and loss account:	
Balance January 1, 1906.....	\$397,574.45
Sundry debit items, including	
doubtful accounts.....	\$6,212.15
June 11, 1906, dividend	
No. 9.....	29,632.40
November 15, 1906, dividend	
No. 10.....	29,632.40
Pig iron account:	
Earnings for the year, after deducting usual charges.....	\$315,390.77
Less interest on bonds and borrowed money.....	22,147.67
Net earnings, after deducting all charges...	\$293,243.10
Amount reserved for refining furnaces.....	97,552.86
Bills payable.....	294,000.00
Accounts payable for book accounts for December.	301,928.09
Total.....	\$3,045,536.55

Record Steel Corporation Earnings.

For the Last Quarter of 1906, \$41,744,964, and for the Year, \$156,619,111.

The statement of the United States Steel Corporation for the quarter ending December 31, 1906, was given out in connection with the directors' quarterly meeting on Tuesday, January 29. It shows total net earnings of \$41,744,964, the largest quarter's record in the history of the corporation. The unfilled orders on hand at the end of the year were also unprecedented, being 8,489,718 tons. On September 30, 1906, this total was 7,936,884 tons; on June 30, 6,809,589 tons; on March 31, 7,018,712 tons; on December 31, 1905, 7,605,086 tons.

The statement of net earnings is given below, with a comparison with the last quarter of 1905. The earnings for December may be slightly changed on completion of the audit of accounts for the year. A complete annual report, comprising general balance sheet, financial statement, statistics, &c., will be submitted at the annual meeting in April, 1907, or earlier:

	1906.	1905.
October, net earnings.....	\$14,984,926	\$12,400,306
November, net earnings....	13,482,464	11,827,215
December, net earnings....	13,277,574	11,051,167
Total after deducting each month the expenditures for ordinary repairs, renewals and maintenance of plants, employees' bonus funds, and also interest on bonds and fixed charges of the subsidiary companies..	\$41,744,964	\$35,278,688
Less appropriations for the following:		
Sinking funds on bonds of subsidiary companies..	\$522,525	\$435,056
Depreciation and reserve funds (regular provisions)	5,523,849	5,185,187
Special improvement and replacement funds....	1,000,000
	7,046,374	\$5,620,243
Balance of net earnings.....	\$34,698,590	\$29,658,445
Deduct interest for the quarter on U. S. Steel Corporation bonds outstanding	\$5,688,497	\$5,743,528
Sinking funds for the quarter on U. S. Steel Corporation bonds—viz.: Installments...\$1,012,500		\$1,012,500
Interest on bonds in sinking funds..... 235,965		180,935
	1,248,465	\$1,193,435
	6,936,962	\$6,936,963
Balance.....	\$27,761,628	\$22,721,482
Less charged off for adjustments in sundry accounts.....	90,651	
	\$27,670,977	
Dividend for the quarter on preferred stock, 1% per cent.	\$6,304,919	6,304,919
Dividend for the quarter on common stock, 1/2 per cent.	2,541,513
	8,846,432	
Surplus for the quarter.....	\$18,824,545	\$16,416,563
Less appropriated from surplus on account of expenditures made and to be made on authorized appropriations for additional property, construction and discharge of capital obligations	15,500,000	9,000,000
Balance of surplus for the quarter	\$3,324,545	\$7,416,563

Large Reservations for New Construction.

It is stated that of the \$15,500,000 set aside for additional property and for new construction \$9,000,000 is to be devoted to the new Gary, Ind., plant. The total set aside for the Gary plant last year was \$27,000,000, which is yet unexpended. The work thus far done has cost \$4,750,000. It is estimated that construction work at Gary in 1907 will require about \$20,000,000, and that the

total spent on all new construction in 1907 will be about \$50,000,000. This is the exact total of the amounts set aside quarterly in 1906 for additional property and new construction, these being, respectively, \$10,500,000, \$13,000,000 and \$11,000,000 for the first three quarters of last year.

It is noteworthy that the total carried to surplus from 1906 earnings, \$17,819,969, brings the surplus of the Steel Corporation up to \$102,558,419, more than realizing the \$100,000,000 figure which has been aimed at for several years, and which has been looked forward to as justifying the payment of dividends on the common stock.

The net earnings for the year 1906 were \$156,619,111, much beyond the best previous year, 1902, when they were \$133,308,763. In 1905 the net earnings were \$119,787,658; in 1904, \$73,176,522, and in 1903, \$109,271,152. The net earnings for the past three years, compared monthly and quarterly, were as follows:

	1906.	1905.	1904.
January	\$11,856,375	\$6,810,847	\$2,868,213
February	10,958,275	6,629,463	4,540,673
March	13,819,840	9,585,586	6,036,346
First quarter....	\$36,634,490	\$23,025,896	\$13,445,232
April	\$12,581,902	\$9,037,925	\$6,863,833
May	14,041,601	10,602,187	6,256,518
June	13,501,530	10,665,004	6,370,374
Second quarter..	\$40,125,033	\$30,305,116	\$19,490,725
July	\$12,242,098	\$9,035,168	\$6,344,771
August	13,158,860	10,986,901	6,202,957
September	12,713,666	11,218,513	6,226,204
Third quarter...	\$38,114,624	\$31,240,582	\$18,773,932
October	\$14,984,926	\$12,400,306	\$7,250,204
November	13,482,464	11,827,215	7,117,418
December	13,277,574	10,988,543	7,009,011
Fourth quarter..	\$41,744,964	\$35,216,064	\$21,466,633
Year	\$156,619,111	\$119,787,658	\$73,176,522

It will be seen that the net earnings last year were more than double those of 1904. The statement of unfilled orders on hand at the close of 1906 compares as follows with previous quarters:

	Tons.		Tons.
December 31, 1906.....	8,489,718	June 30, 1904.....	3,192,277
September 30, 1906..	7,936,884	March 31, 1904.....	4,136,961
June 30, 1906.....	6,809,589	December 31, 1903..	3,215,123
March 31, 1906.....	7,018,712	September 30, 1903..	3,278,742
December 31, 1905..	7,605,086	June 30, 1903.....	4,666,578
September 30, 1905..	3,865,377	March 31, 1903.....	5,410,719
June 30, 1905.....	4,829,655	December 31, 1902..	5,347,528
March 31, 1905.....	5,597,580	September 30, 1902..	4,843,007
December 31, 1904..	4,696,203	June 30, 1902.....	4,791,993
September 30, 1904..	3,027,436		

Labor Notes.

On January 15 the boilermakers and helpers in the Youngstown, Ohio, District, made a general demand for an increase in wages. Most of the employers paid no attention to the demand and the men did not go on strike. Others gave their men a slight advance in wages, but it has been uniform. Practically all the boiler shops in the district are in full operation, but a few are somewhat short of men.

The Standard Boiler & Plate Iron Company, Niles, Ohio, has made an agreement with its boiler makers and helpers, and its plant is now in full operation, with plenty of orders.

At Washington the House Committee on Interstate and Foreign Commerce has been holding hearings on the Townsend bill which carries out one suggestion of the President's message, in providing for the appointment by the President of a commission for the investigation of labor disputes and their causes, and to publish the results of the inquiry, same for the purpose of bringing about an amicable adjustment. The bill seeks to make it legally possible for the President in such an issue as that of the anthracite coal strike to do what he undertook to do at that time. It is not compulsory arbitration, but it is investigation and publication of facts in order that public opinion may be informed as to the merits of the case. Some of the members of the committee are opposed to the bill because of the door it opens for executive interference.

PERSONAL.

Guy R. Johnson, recently elected director of the Alabama Consolidated Coal & Iron Company, has also been elected vice-president and general manager, with offices in the First National Bank Building, Birmingham, Ala. Mr. Johnson will retain his interest at Clarksville.

Thomas Farmer, Detroit, Mich., has accepted a position with the Warner & Swasey Company, Cleveland, Ohio, as its Western representative.

Willard Warner, Jr., superintendent of the Roane Iron Company, Rockwood, Tenn., has been elected president of the Chattanooga Coffin & Casket Company, succeeding his deceased father, former United States Senator Willard Warner. F. H. Clymer, Reading, Pa., is expected to succeed Mr. Warner as superintendent of the Roane Iron Company.

D. R. Mathias, general superintendent of the Joliet Works of the Illinois Steel Company, has gone to Europe, and will visit iron and steel works in several prominent districts.

F. C. Irvine has resigned as sales manager of the American Rolling Mill Corporation and will engage in the brokerage business at 1243 Marquette Building, Chicago.

Wm. G. Mather, president of the Cleveland-Chiffs Iron Company, Cleveland, Ohio, has been kept from his office for some months by ill health.

E. G. Spillsbury, New York, is in a hospital at Nogales, Ariz., having broken a leg and an arm in a fall while there on a professional trip.

Dr. Charles D. Walcott, who has had charge of the United States Geological Survey for the past 12 years, has been elected secretary of the Smithsonian Institution.

C. G. Beach is now in charge of the Universal pipe department of the Central Foundry Company, 116 Nassau street, New York City. Mr. Beach has been with the company for a number of years and is thoroughly conversant with its policy. He assumes the management of the Universal pipe department on the resignation of Mark Dean. Mr. Dean will continue to serve the company in an advisory capacity, but has resigned in order to devote more of his time to the development of his inventions in other fields.

William H. Vialle, representing the American Steel & Wire Company in Connecticut, is receiving congratulations on the completion of 25 years of continuous service as sales agent in that field, having commenced with the Washburn & Moen Mfg. Company in 1882.

Dwight W. Grover has resigned the vice-presidency of the Keystone Emery Mills, Frankford, Philadelphia, Pa., and Charles Lockwood the treasurership, both to take effect February 1.

President John A. Topping, Executive Committeeman Grant B. Schley, E. W. Oglebay, L. C. Hanna, and John W. Gates and Vice-President L. T. Beecher of the Tennessee Coal, Iron & Railroad Company, are now on a tour of the company's properties in the Birmingham District. Mr. Gates will go from Birmingham to California, for a stay of several weeks.

The annual report of Frank P. Sargent, Commissioner General of Immigration, for the fiscal year ended June 30, 1906, shows that 1,100,735 immigrants were admitted to the United States. Of these 913,935 were of ages between 14 and 44, while but 50,507 had reached or passed 45. From the following countries the immigration in the fiscal year 1906 was less by the figures shown than in 1905: Ireland, 17,950; England, 15,218; Sweden, 3281; Germany, 3010; Denmark, 1129; Scotland, 1111. The principal gains are from the following: Italy, 61,841; Russia, 30,768; Greece, 8974; Turkey, 5168. The total money shown by the immigrants of the year was \$25,100,413.

The special commission appointed to consider the construction of bridges will recommend to the New York Legislature the construction of two bridges from Staten Island and one from Manhattan to New Jersey.

OBITUARY.

JAMES ALBERT HAYDEN, a resident of New York City, who was long prominent in the brass trade, died suddenly January 23, aged 81 years. He was born in Waterbury, Conn., in 1825, and removed to New York in 1844. He was then connected with a dry goods importing firm. Afterward he was a promoter of the firm of Holmes, Booth & Hayden, founded in 1853. He was vice-president of this corporation from 1855 until his retirement in 1876. He was also a director in the Manhattan Brass Company and the American Surety Company. He leaves a widow, a daughter and two sons.

P. HENRY HERBERT, Worcester, Mass., formerly one of the owners of the Globe Foundry of that city, died January 23, aged 53 years. He was a native of St. John, N. B., and learned the molder's trade at Worcester.

EDWIN A. STRATTON, Greenfield, Mass., one of the founders of the firm of Stratton Bros., manufacturers of levels, died recently, aged 87 years. He was born in Northfield, Mass. He learned the carpenter's trade, and after working at it for a while at Boston went to Greenfield in 1848. In company with his brother he built many of the houses of the town. The business of Stratton Bros. was established in 1869 and is still carried on. Mr. Stratton leaves a widow and two daughters.

A. R. LUDLOW, president of the Springfield Malleable Iron Company, Springfield, Ohio, died January 2, aged 81 years. He had been engaged in the foundry business since 1863 and started the first gray iron foundry of importance in Springfield. His connection with the Springfield Malleable Iron Company dates from 1880.

R. C. FAULCONER, for years prominent in the foundry and machinery trades, died at New Bedford, Mass., January 18, aged 62 years. He was born in England. After several years of connection with railroads at Detroit as purchasing agent and in other capacities, he engaged in the lumber business at Alpena, Mich. He was one of the organizers of the Leland & Faulconer Mfg. Company, Detroit, being associated with H. M. Leland in bringing that enterprise to a very successful footing. Ill health led to Mr. Faulconer's retirement from the company in 1901.

JULES MAGERY, for many years the technical director of the Aachen Steel Works at Rothe Erde, died at Naumur, Belgium, on January 15, at the age of 67 years. He retired from the active management some years since, and seized the occasion of the meeting of the Iron and Steel Institute, of which he had been a member for many years, to visit this country. He took an eager interest in the economic development of Belgium, his native country.

The firm of Lindsley & Eckliff, 48 Shelby street, Detroit, Mich., has been organized by W. L. Lindsley and J. C. Eckliff to handle the products of the Braeburn Steel Company, Keystone Coal & Coke Company, Latrobe-Connellsville Coke Company and the Orient Coke Company in the States of Michigan and Ohio and Western Ontario. A complete stock of Braeburn steel will be carried in the firm's Detroit warehouse to supply the needs of the local market and surrounding territory. Mr. Lindsley has been associated with the Braeburn Steel Company during the past four years, representing it in the same territory the new firm covers, and Mr. Eckliff has been associated with the Keystone Coal & Coke Company and Rogers, Brown & Co. in Pittsburgh, during the past two years.

Notwithstanding the fact that most of the railroads in Germany are owned and operated by the Government, the shortage of the cars in that country has for many months been fully as serious as in the United States. The extraordinary activity in the German iron and steel industry was the cause of the unusual demand for cars. For a portion of the past year the miners in a number of collieries were temporarily compelled to stop work because of the deficiency in the car supply.

NEWS OF THE WORKS.

Iron and Steel.

The Bostwick Steel Lathe Company, Niles, Ohio, is considering the advisability of erecting a plant for the manufacture of galvanized sheets, but has not come to a definite decision in the matter.

The blast furnace of the Tidewater Steel Company at Chester, Pa., recently leased by the Maryland Steel Company, was put in blast January 22, and it will run on a level for some time.

The Parkersburg Iron & Steel Company, manufacturer of sheets, Parkersburg, has issued a circular assuring its customers that regular shipments, which had been suspended for several days by reason of the severe Ohio River floods which covered the tracks in its yards, have been resumed, and it is hoped there will be no further interruption.

Owing to the failure of the Waynesburg National Bank, Waynesburg, Pa., the W. H. Griffiths Company, which owns a tin plate plant in that city, has been placed in the hands of Harry L. George and M. R. Travis as receivers. The mill, which is equipped with modern machinery, will not be operated by the receivers, who intend to dispose of it at the first opportunity.

The Lessig Iron Works, at Pottstown, Pa., have been started up after the usual winter inspection.

It is stated that the Potts Bros. Iron Company, Pottstown, Pa., will rebuild within a short time on the same site as the mill recently burned.

G. W. McClure, Son & Co., engineers and contractors, Bessemer Building, Pittsburgh, have orders on hand for McClure fire brick hot blast stoves of the three-pass type, as follows: Tennessee Coal, Iron & Railroad Company, Ensley, Ala., 9 stoves, 21 ft. diameter by 100 ft. high; Republic Iron & Steel Company, Thomas, Ala., 6 stoves, 21 ft. diameter by 85 ft. high; National Tube Company, Monongahela furnaces, McKeesport, Pa., 5 stoves, 22 ft. diameter by 90 ft. high; Bethlehem Steel Company, South Bethlehem, Pa., 5 stoves, 22 ft. diameter by 100 ft. high; Indiana Steel Company, Gary, Ind., 16 stoves, 22 ft. diameter by 95 ft. high; Temple Iron Company, Temple, Pa., 3 stoves, 18 ft. diameter by 70 ft. high; Perry Iron Company, Erie, Pa., 3 stoves, 21 ft. diameter by 70 ft. high; Shenango Furnace Company, Sharpsville, Pa., 4 stoves, 21 ft. diameter by 85 ft. high; Robeson Iron Company, Limited, Robesonla, Pa., 1 stove, 18 ft. diameter by 85 ft. high; Carnegie Steel Company, Duquesne furnaces, Duquesne, Pa., 8 stoves, 22 ft. diameter by 100 ft. high. Contracts for this type of stove have recently been completed as follows: Kittanning Iron & Steel Company, Kittanning, Pa., 1 stove, 20 ft. diameter by 80 ft. high; Cherry Valley Iron Company, West Middlesex, Pa., 3 stoves, 21 ft. diameter by 70 ft. high; Midland Steel Company, Midland, Pa., 4 stoves, 21 ft. diameter by 100 ft. high; Buffalo Union Furnace Company, Buffalo, N. Y., 1 stove, 18 ft. diameter by 75 ft. high.

The Carnegie Steel Company has broken ground at its Ohio works, Youngstown, Ohio, for the building of 12 50-ton open hearth furnaces, work on which will be pushed as fast as possible.

Reports that the Carnegie Steel Company would build at the Homestead Steel Works the largest plate mill in the world, to roll plates 168 in. wide, are officially denied. It is possible that some time the Carnegie Company may build another large plate mill at the Homestead works, but at present there are no definite plans under way.

By order of the court, the steel plant of Howe, Brown & Co., Penn avenue and Seventeenth street, Pittsburgh, will be sold at master's sale on February 18. William Wishart, 434 Diamond street, Pittsburgh, is master and will have charge of the sale. No bid will be received less than \$500,000.

The Struthers Furnace, operated by the Struthers Furnace Company at Struthers, Ohio, was blown out January 28 for relining. It is expected that it will be blown in again in five or six weeks.

General Machinery.

Tate, Jones & Co., Incorporated, Empire Building, Pittsburgh, have just shipped 10 oil burning furnaces with necessary pumping outfit to the Penn Bridge Company, at Beaver Falls, Pa. The same firm recently installed a number of oil burning furnaces in the plant of the Toledo-Massillon Bridge Company of Toledo, Ohio.

The Pittsburgh Automatic Vise & Tool Company, Wabash Building, Pittsburgh, has received an order for nine large railroad vises for delivery to the Tennessee Coal, Iron & Railroad Company of Birmingham, Ala. Each of these vises weighs 695 lb. and are said to be more than twice the size of the largest vises ever built. The company is securing considerable export business for its vises and has opened a branch house in Leeds, England. It has also received an order from Takata & Co. of New York City for several large railroad vises for shipment to Tokio, Japan, while a shipment of vises has recently been made to Barcelona, Spain.

F. B. Redington & Co., machinists, 107 and 109 South Sangamon street, Chicago, whose business heretofore has been conducted as a partnership, will now incorporate. The management and policy of the business will continue as heretofore.

The Taylor Engineering & Construction Company, Youngstown, Ohio, has recently shipped a large consignment of machinery to Mexico for a smelter plant.

The Monessen Foundry & Machine Company, Monessen, Pa., manufacturer of rolling mill machinery, has recently added new equipment to its plant by which its output has been increased 50 per cent.

The Canada Foundry Company, Toronto, Ont., which turned out its first locomotive about a year ago, has been so successful in securing orders for this department that it has been found necessary to build a special shop to carry on this branch of the business.

The McMyler Mfg. Company, Warren, Ohio, builder of hoisting and conveying machinery, advises us that reports that it would build large extensions to its plant are untrue. This company has no plans under way at present for enlarging its plant.

The business of Burton B. Walker, Ellsworth, Maine, has been incorporated as the Ellsworth Foundry & Machine Works. The company will continue the manufacture of the same products but on a somewhat larger scale, including gasoline engines, stove mills, waste burners and other mill machinery. J. A. Peters is president, Charles Peters treasurer, B. B. Walker general manager, and B. B. Walker, H. W. Cushman and J. A. Peters are the directors. The company has a good sized plant, with ample water frontage on Union River.

Slater & Marsden, Beloit, Wis., manufacturers of agricultural and woodworking machinery, contemplate building a 50 x 90 ft. addition to their present plant, work upon which will be begun about May 1.

The Freeport Mfg. Company, Freeport, Ill., has been incorporated with a capital of \$15,000, and will engage in the manufacture of machinery. The incorporators are Fred Dorman, H. F. Dorman and August F. Hoefler.

Pawling & Harnischfeger, Milwaukee, Wis., will shortly begin work on a 100 x 355 ft. extension to the main building of their works to provide increased facilities for the electrical and machine departments, the assembling and erecting floors and the glider shop, that are necessary to take care of the large volume of crane business and to meet the demands for early deliveries. This will be the second addition since the plant was erected in 1905, and when completed will make this building 355 x 360 ft., providing 127,800 sq. ft. of floor space on one level. All needed machine tool equipment has been purchased. Crane sales entered the past month include: The Donaldson Iron Company, Emaus, Pa., one 12-ton, 50 ft. span; one 5-ton, 20 ft. span; American Locomotive Company, New York, one 20-ton, with auxiliary hoist, 67 ft. 6 in. span, two 10-ton, 47 ft. span; Smith Machine Company, Milwaukee, one 6-ton, 32 ft. span; Washington Carbon Company, Washington, D. C., one 10-ton, 82 ft. 1 1/4 in. span; Chicago & Milwaukee Electric Railroad Company, Chicago, one 60-ton, with auxiliary hoist, 63 ft. span; Wisconsin Engine Company, Corliss, Wis., one 25-ton, 69 ft. 11 1/2 in. span; American Bridge Company, Pittsburgh, one 10-ton, 45 ft. 6 in. span; one 10-ton, 37 ft. 6 in. span; one 5-ton, 38 ft. 8 1/4 in. span; Minneapolis Steel & Machinery Company, Minneapolis, Minn., one 30-ton, with auxiliary hoist, 56 ft. 7 in. span; Chicago, Milwaukee & St. Paul Railroad, Chicago, Ill., one 15-ton, 42 ft. 6 1/4 in. span; Keith Paper Company, Turners Falls, Mass., one 5-ton hand crane; El Paso Foundry & Machine Company, El Paso, Texas, one 15-ton, with auxiliary hoist, 56 ft. 8 in. span; Newport News Shipbuilding & Dry Dock Company, two 25-ton, with auxiliary hoist, 47 ft. 10 1/2 in. span; Coffin Valve Company, Boston, Mass., one 20-ton, 25 ft. 7 in. span; Ball Engine Company, Erie, Pa., one 20-ton, 56 ft. 11 1/4 in. span, one 1 1/2-ton, 21 ft. 6 1/4 in. span; Firth Sterling Steel Company, Pittsburgh, Pa., one 25-ton, with auxiliary hoist, 71 ft. span; Ottumwa Iron Works, Ottumwa, Iowa, one 15-ton, with auxiliary hoist, 36 ft. 5 in. span; H. J. Hoerner & Sons, Newark, N. J., one 15-ton, 60 ft. span, one 5-ton, 60 ft. span; Bethlehem Steel Company, one 10-ton trolley; American Smelters' Securities Company, Garfield, Utah, one 5-ton hand crane; Queen City Foundry Company, Denver, Colo., one 10-ton, 39 ft. 10 in. span; Waterbury Brass Company, Waterbury, Conn., two 3-ton electric travelling hoists; Kutztown Foundry & Machine Company, Philadelphia, Pa., one 10-ton, 60 ft. span; Chicago, Burlington & Quincy Railroad, one 7 1/2-ton, 58 ft. 4 1/4 in. span.

Recent contracts of the Buffalo Forge Company, Buffalo, N. Y., include: City of Cameron, Mich., 12 x 13 in. horizontal side crank engine; Maritime Coal, Railway & Power Company, Montreal, Que., two 7 x 12 in. side crank engines; Webster Manual Training School, Omro, Wis., six down draft forges, one No. 4B volume blower, one 40-in. exhaustor; a manufacturing company, Carlisle, Pa., seven heavy down draft forges, one railroad type forge, one 60-in. exhaustor; University of Wyoming, Laramie, Wyo., one 12-fire forge, one 60-in. exhaustor; Robertson-Cary Company, St. Paul, Minn., five down draft forges, one No. 4B volume blower, one 40-in. exhaustor; Dewey Portland Cement Company, Dewey, I. T., five 70-in. electric fans, each direct connected to 30-hp. motor, three No. 3B volume blowers, one 80-in. planing mill exhaustor driven by 20-hp. motor, and one dust separator with inlet 30 in. diameter of No. 12 gauge steel to handle exhaust from kilns; Marlon Brick Works, Melcher Station, Ind., two 96-in. disk wheels; Alton Paving, Building & Fire Brick Company, Alton, Ill., two 96-in. disk

wheels; for export to Brussels, six 80-in. pulley fans and one 50-in. pulley fan; Owego Bridge Company, Owego, N. Y., one 110-in. steam fan, one single vertical engine to drive it at 225 rev. per min., heater, ducts, &c., to heat bridge shop; West Virginia Pulp & Paper Company, Piedmont, Va., fan, heater, ducts, rolling shutters, ducts and an air washer, the latter constructed entirely of copper, to be used for drying; Hygienic Food Company, Battle Creek, Mich., drying apparatus.

The J. L. Krom Machinery Company has been organized to deal in second-hand machinery, with offices at 143 Liberty street, New York. J. L. Krom is the principal stockholder.

The George A. Hogg Iron & Steel Foundry Company, Pittsburgh, Pa., is building a heavy scrap shear to cut 5 x 5 in. material for the Loucks Iron & Steel Company, Roanoke, Va., and also has an order from the Maryland Rail Company, Cumberland, Md., for three conveyors for a rail mill and an engine driven rail breaker.

Power Plant Equipment.

Morristown, Tenn., has appropriated \$350,000 for the purchase of new machinery and making improvements to its electric light plant and water works.

A bill is before the Rhode Island Legislature to incorporate the Scituate Light & Power Company, with a capitalization of \$250,000. The company proposes to establish power plants on the Pawtuxet River at Saundersville, Rockland, Poonegansett and Clayville, using hydraulic power, and will furnish electric power to the towns of Scituate, Burrillville, Glocester and Foster, in Rhode Island. The incorporators are William E. Joslin, Scituate, R. I., and Edwin A. Smith and William Joslin, Providence.

The Hildreth Mfg. Company, successor to the Hildreth Motor & Pump Company, Lansing, Mich., has increased its capital stock from \$30,000 to \$75,000, and in addition to its regular line of foundry work will engage in the manufacture of marine engines.

The Pittsburgh Feed Water Heater Company, Pittsburgh, has recently made sales of feed water heaters as follows: Bessemer & Lake Erie Railroad, Greenville, Pa., one 1500-hp.; H. C. Frick Coke Company, Trauger Station, Pa., one 1000-hp.; Hygienic Ice & Cold Storage Company, Pulaski, Va., one 100-hp.; Campbell & Deane Company, Straw Plains, Tenn., one 175-hp.; Sibley Lumber Company, Detroit, Mich., one 175-hp.; Perkins Sanitary Refrigerator Company, Battle Creek, Mich., one 150-hp.; Leechburg Electric Light & Power Company, Leechburg, Pa., one 300-hp.; American Car & Foundry Company, Detroit, Mich., two 1500-hp.; Merkle Machinery Company, Kansas City, Mo., one 150-hp., making a total of 6475 hp.

The Brooks Foundry & Machine Company has been incorporated at Niagara Falls, N. Y., with a capital of \$50,000, to manufacture gas engines, &c. G. C. Brooks is to be at the head of the company.

The National Producer Gas Power Company, 1123 Broadway, New York, incorporated with a capital stock of \$500,000, will manufacture producer gas plants under patents of J. R. Wilmot which have been in operation with much success for some years in Europe and more recently in Canada. J. R. Wilmot is president and general manager; J. R. Tennant, vice-president; S. S. Stewart, secretary and treasurer, and H. R. Lounsbury, Jr., assistant manager.

The Crocker-Wheeler Company, Ampere, N. J., has secured the following orders from some of its most important customers during the last few weeks: Bridgeport Malleable Iron Company, Bridgeport, Conn., one 200 and one 90-kw. direct current generator; Pittsburgh & Baltimore Coal Company, Edna Mine, No. 2, Wendel, Pa., one 300-kw. direct current generator; W. & J. Knox Net & Twine Company, Baltimore, Md., 25 25-hp. direct current motors; Bridgeton Electric Company, Bridgeton, Conn., one 500-kw. direct current generator; Alliance Machine Company, Alliance, Ohio, 74 motors ranging from 6 to 100 hp., all of 220 volts; Bosches Troy Laundry, Austin, Texas, 14 motors ranging from 1/4 to 7 1/4 hp., and one 35-kw. generator.

The Pittsburgh Valve, Foundry & Construction Company, Pittsburgh, Pa., has received a large order for the general piping equipment for a cement plant for the Western Canada Cement & Coal Company, Exshaw, Alberta, Canada. This is a similar plant to that of the Western State Portland Cement Company, at Independence, Kan., which was completed some time ago.

Foundries.

In an item in these columns last week concerning the new malleable foundry of the Pittsburgh Valve Company, Barberton, Ohio, it was erroneously stated that the cupolas had been fired. The company has not installed cupolas in its malleable pipe fitting department, but two 35-ton air furnaces. It is claimed that malleable pipe fittings made from air furnace metal are superior to fittings made from cupola iron.

The Trinidad Foundry & Machine Company, Trinidad, Colo., has recently been incorporated with a capital stock of \$50,000 by Merdo MacKenzie, J. C. Hudelson, W. M. Rapp and F. J. Radford. The new organization, which will absorb the Trinidad Foundry & Machine Works, will manufacture mine cars, mine equipment and machinery castings. Within a few months it will increase its present capacity by the erection of a foundry, 64 x

128 ft., and a machine shop, 54 x 128 ft., which will be equipped with modern machinery.

The Crane Company, Chicago, now has its new steel foundry in full running order. In this department steel valves and fittings will be a specialty, and the facilities are such that promptness in the filling of orders for these goods is assured.

The Watt Mining Car Wheel Company, Barnesville, Ohio, has, owing to the death of its president, R. R. Watt, elected new officers as follows: President and treasurer, J. W. Watt; vice-president and superintendent, S. Watt, and secretary and general manager, P. H. Laughlin.

The Van Buren Foundry, Van Buren, Ark., will rebuild its foundry, which was recently destroyed by fire. James Morell, the proprietor, has not yet decided upon the equipment that he will have to purchase for the new plant.

The Champion Machinery Company, Joliet, Ill., has purchased additional property to erect a new foundry for the manufacture of castings for its own use. Work on the new plant will be begun at once.

The Benton Harbor Malleable Iron Foundry, Benton Harbor, Mich., will soon commence the erection of a new foundry plant, the cost of which will be about \$20,000.

The Geneva Foundry & Machine Company, Geneva, Ill., has increased its capital stock from \$5000 to \$7200.

The structural steel for the new plant of the United States Cast Iron Pipe & Foundry Company, at Scottsdale, Pa., has commenced to arrive, and the actual work of construction will be started at once. The main building will be 100 x 638 ft. and will have several wings and annexes. The new plant when completed will be one of the finest plants in western Pennsylvania for the manufacture of cast iron pipe.

The Pearson Mfg. Company, Allegheny, Pa., has recently received an order from the Butler Car Wheel Company, Butler, Pa., for 108 wheel pits, in which car wheels will be annealed. Delivery of these pits will be started about February 20. Thomas K. Gray, recently connected with a Western railroad, has resigned to become secretary and treasurer of the Pearson Mfg. Company.

Bridges and Buildings.

Bids have been asked by the counties of Washington and Westmoreland, Pa., for the erection of a bridge over the Monongahela River at Donora. The bids will be received at Greensburg and Washington, Pa., and opened at Greensburg on February 20. The estimated cost is about \$170,000 to \$180,000.

The Los Angeles Gas & Electric Company, Los Angeles, Cal., is preparing plans for the complete rebuilding of the structural portion of its plant. The plans provide for fireproof construction throughout.

Motors and Small Engines.

The Eck Dynamo & Motor Company, recently incorporated, has taken over the plant and business of the Eck Dynamo & Motor Works, Belleville, N. J., and will continue the manufacture of dynamos, motors, Eck oscillating fan motors, and in addition will develop a line of alternating current fans and motors.

The recently organized Oswald Motor Company, Goshen, Ind., has rented a shop which it equipped with machinery.

Fires.

The tannery of the American Hide & Leather Company, Chicago, Ill., was destroyed by fire January 22, the loss being about \$100,000.

The plant of the Belle City Mfg. Company, Racine, Wis., was destroyed by fire January 22. The loss is placed at \$10,000.

The plant of the George H. Smith Steel Casting Company, Milwaukee, Wis., was damaged by fire January 21.

The car barn and equipment of the Camden Interstate Railway Company, Huntington, W. Va., were destroyed by fire January 23. The loss on machinery is placed at \$10,000.

Mill No. 1 of the large plant of the Cochecho Mfg. Company, at Dover, N. H., was burned January 27, the loss being about \$500,000.

A four-story building comprising a paint shop, sheet metal working shop, connecting rod finishing shop and storerooms of the Baldwin Locomotive Works, covering nearly half a block at Fifteenth and Spring Garden streets, Philadelphia, Pa., was entirely destroyed by fire January 29. The loss is placed at \$500,000.

Hardware.

Liveright Brothers, Philadelphia, manufacturers of files and rasps, state that during the course of the year they must look for larger quarters to meet the demands of their expanding business. Their works have been running to their utmost capacity, but orders are constantly accumulating, and with present facilities goods cannot be turned out quickly enough to satisfy customers.

Iwan Brothers, Streator, Ill., have lately received an order from South Africa for several designs of their 3 and 4 in. post hole augers to be used in diamond prospecting. The company states that Iwan augers are made in such a wide range of sizes, ranging from 3 to 14 in., that they may be easily adapted

to many special classes of work, including telegraph construction, securing soil samples, agricultural experiments, prospecting for various deposits, boring shallow wells, locating drains and water pipe and in irrigating work. A booklet is published entitled "Easy Digging," which fully describes these tools and explains their use for various purposes.

The Union Steel Screw Company, Cleveland, Ohio, is substituting gas engines for steam for power equipment and expects that the new equipment will be much more economical than the old. Three 100-hp. engines of the Bruce-Mariam-Abbott Company make are being installed. The company is adding to its product, having recently commenced to manufacture bolts and rivets as well as screws.

Small Bros., Dunham, P. Q., have purchased a manufacturing property at Richford, Vt., where they will manufacture sugar evaporators. The company has a general line of equipment used in the making of maple sugar.

The Hayden-Corbett Chain Company, Columbus, Ohio, has just completed the installation of the machinery in its recently erected addition, and the entire plant is now being operated to its fullest capacity, employing 200 men.

The capital stock of the Smith Improved Lock Nut Company, Rockford, Ill., has been increased from \$30,000 to \$60,000. This company has just completed a new brick addition to its plant to take care of the expanding business in the truck bolt department.

The Mills Flycatching Screen Company, Boulder, Colo., has been incorporated with a capital stock of \$50,000, the incorporators being Norman W. Mills, Fred White and Nicholas R. Herivell. The company is organized for the purpose of manufacturing a wire screen, which is designed not only to exclude, but also to catch and kill flies and insects alighting on it.

The Simeon L. & George H. Rogers Company, Hartford, Conn., manufacturer of silver plated ware, has reorganized with a new board of officers. George M. Hallenbeck is the president, treasurer and general manager; Charles P. Cooley, vice-president; Harry L. Cram, clerk, and R. E. Sage, secretary and assistant treasurer. Mr. Hallenbeck was formerly the vice-president of the company.

The Noera Mfg. Company, Waterbury, Conn., manufacturer of hardware specialties, has increased its capital stock from \$50,000 to \$75,000.

The Massachusetts Abrasive Product Company, Chester, Mass., has been organized to manufacture grinding wheels and sharpening stones, and has begun the erection of works in that town. W. Clayton Fay, Springfield, Mass., is at the head of the business.

The Hurley Machine Company, 153-159 S. Jefferson street, Chicago, Ill., reports a large demand for its machines from Europe, where they are supplanting hand scraping on parquette floors. There is a good deal of this class of flooring in Europe and the Little Giant floor scraper seems to be filling a long felt want. Although Mr. Spaulding, the managing director of the French company, has been in Europe but six weeks, he has already sent in orders for several hundred machines. The indications are that the French and German companies will do a very large business.

The vise factory of Peter A. Frasse & Co., New York, including machinery, tools, patents, &c., has been sold to the G. M. Yost Mfg. Company, Waynesboro, Pa., which has moved the plant to Mechanicsburg, Pa. The company expects to have its new factory in operation by February 10, where it will manufacture a full line of the well-known Stephens' patent vise, all sizes and styles of the Snediker rapid transit vise, a full line of Standard vises of improved make and the Snediker quickly adjusted leg vise. All communications should be addressed to the office at Mechanicsburg.

The new plant of the Republic Stamping & Enameling Company, manufacturer of French mottled ware, Canton, Ohio, has been put in operation. Foundations for the new works were begun last August and unusual activity prevailed while the plant was under construction. The works contain the most modern equipment for the manufacture of granite ware, having modern facilities for the rapid and economical handling of product. At present the plant contains two general departments, stamping and enameling, but it is the intention to add mills later on for the rolling of sheets, of which the company will use upward of 4000 tons annually. The plant is now running in splendid shape, with an approximate output of 30,000 pieces of granite ware daily, and we are advised that it has the largest works for the exclusive manufacture of granite ware in the United States.

Miscellaneous.

The Washington Coal & Coke Company, Dawson, Pa., built 235 coke ovens last year, making its total number on January 1, 1907, 1000 ovens. Other improvements made at its works last year were a pipe line to the new reservoir the company is building, a new steam and electric plant using the waste heat of the ovens for fuel for the boilers; also an additional fan for ventilation. The entire cost of the improvements, including new houses for employees, was about \$225,000. All of the company's coke plants are now in the best workable condition for safety and practicability.

The Niagara Radiator Company, Tonawanda, N. Y., has been placed in the hands of a receiver, Allan N. McNabb of Buffalo, who will act under the jurisdiction of an advisory committee of five of the creditors pending a reorganization of the company with an increase in the capital stock. It is stated the assets of the company exceed the liabilities by \$150,000, but the management has been crippled by limited capital. The operation of the plant will be continued, the company having numerous orders in hand.

The Hayes Run Fire Brick Company, Orvis, Pa., has about completed the second addition to its plant.

The plant of the Grand Rapids Gas Engine & Yacht Company, Grand Rapids, Mich., recently suffered a fire loss which, however, was not so serious as first reported. The pattern making room was damaged, but the fire fortunately was arrested before reaching the pattern storeroom. No damage was done to the principal tools and machinery.

Work is to be pushed rapidly on the large plant of the American Can Company to be erected at New Castle, Pa. The location is south of the Shenango tin plate mills in the southern part of the city. The main building will be 80 x 500 ft., of brick and steel, two stories high. Machinery for the manufacture of tin cans will occupy both floors. The foundations will be of concrete.

The Diamond Rubber Company, Akron, Ohio, has started some important additions to its plant. A four-story office annex, 40 x 140 ft., is now in the course of construction, and an addition to the factory, 140 x 320 ft., will be built in the spring. It will be six stories high. The first story will be used for a machine shop and the remainder of the building for its tire department.

The Sterling Electrical & Mfg. Company, Warren, Ohio, manufacturer of incandescent electric lamps, will build an addition to its factory, 60 x 160 ft., in the spring. The lamp factory of the New York & Ohio Company in Warren will also be enlarged.

The Bickford Fire Brick Company, Lock Haven, Pa., has been organized with a capital of \$500,000 stock and \$350,000 bonds. Land has been secured carrying fire clay near Du Bois and it is expected that a plant will be built and in operation early in the fall, with a capacity of 110,000 high grade hand made fire brick per day.

The Blaw Collapsible Steel Centering Company has leased the plant formerly occupied by the Garland Chain Company at Rankin, Pa., near Pittsburgh. The lot is 140 x 310 ft., with a one-story ironclad building.

The Hydraulic Pressed Steel Company, Cleveland, Ohio, which was reorganized a few months ago with a capital stock of \$150,000, started its new plant in operation the past week. The company purchased the plant of the Snider-Hughes Pump Company, which recently moved to Canton. The site includes 5 acres of ground. The Hydraulic Company has purchased several hydraulic presses, shears, punches and other machine tools and a large part of the new equipment has already been installed. The company will turn out pressed steel automobile frames and other automobile parts and bicycle sprockets and will do a general stamping business. A. W. Ellenberger is president; J. H. Foster, vice-president and manager; H. F. Pettet, secretary and treasurer. Mr. Foster was recently assistant manager of the Parish & Bingham Company of Cleveland. The new company starts in business with enough orders to keep its plant busy for some time.

D. E. Baxter & Co., railroad contractors, 27 William street, New York, have placed a large order for contractors' tools with the Standard Repair & Supply Company for the Harrisburg & Ohio River Railroad, which they are building in Illinois.

A meeting of the stockholders of the Berger Mfg. Company, Canton, Ohio, sheet metal workers, has been called to vote on the question of increasing the capital stock from \$1,000,000 to \$1,500,000.

The Cleveland Galvanizing Works Company, Cleveland, Ohio, has just issued a new catalogue and price-list of its white metal pattern letters and figures. This company has worked out a new process which, it claims, produces much better letters than have formerly been made.

The Lake George Boat Mfg. Company has incorporated and will erect a plant at the head of Lake George with a capacity of three or four launches a month. The company will confine itself to boats of the smaller sizes and in addition to manufacturing will pay special attention to repair work. F. D. Morehouse, Glens Falls, N. Y., is interested.

James Ackroyd & Son, Albany, N. Y., who are erecting a new shop, 60 x 100 ft., with an addition 25 x 40 ft., and storage sheds 20 x 100 and 30 x 100 ft., has purchased the equipment. The drop press and miter cutting machines will be made by Loy & Nawrath, Newark, N. J.

John W. Dickie & Son, San Francisco, Cal., who operate shipyards at Alameda, have secured a site at Raymond, Wash., where they will construct a modern shipyard, installing marine ways, power house, pattern lofts, carpenter shops and other departments. This yard will be devoted to the construction and repair of wooden vessels.

The Iron and Metal Trades

Deliveries of Pig Iron to foundries and Steel works have been better, particularly north of the Potomac and east of the Allegheny Mountains, and the demand for spot and prompt Iron has much lessened. The territory more directly dependent upon Southern Iron seems still to be suffering from inadequate shipments. Generally speaking foundries have been much exasperated during the past few months over the inability to get Iron on old lower priced contracts, while a stiff premium when paid for spot brought the same Iron to the foundry. Foundries, too, are exercised all over the country over the action of the railroads in demanding an advance of 25c. per ton freight on Pig Iron from Southern furnaces, effective February 1, when the very Iron was due them months ago, and did not reach them because the railroads could not handle it.

Prices abroad have weakened and Middlesbrough to-day was reported at 56s. 10½d. This means that No. 3 Middlesbrough can be laid down, duty paid, at \$19.50 to \$20. Last week some foreign Iron was sold on arrival at a concession in preference to storing. There is still considerable foreign Iron to come, practically all of it sold. There is at least one large inquiry for foreign Iron in the market, but that is for a consumer who would use it for export goods.

So far as the Pig Iron market for the second half of the year is concerned, there has been quite a movement in the Central West. Cincinnati reports sales of 15,000 tons for the second half to a large implement maker, a total of 10,000 tons to two malleable foundries, and 8000 tons to a car builder. In New England a number of melters have purchased an aggregate of about 5000 tons at a shade under \$24. Pittsburgh reports the market for Bessemer Pig a shade easier for the second and third quarters, quoting Valley Iron at \$22 at furnace. Ferro-manganese is weaker.

The condition of the Finished Iron and Steel markets is well reflected in the large amount of orders which the Steel companies have on their books. No particularly large sales of Steel Rails are reported, but it is a fact that premiums are being offered to the mills to secure deliveries during the first half of the year. The same is true of Plates.

The supply of Steel from outside sources is growing slightly better. The Steel Corporation itself is suffering from shortage as keenly as ever, and the Ohio mill has been put on Sheet Bars for a week, to help out in that direction.

Orders continue to flow into the Structural mills, both for buildings and for bridges. Among the former is a lot of 4500 tons out of a total of about 12,000 tons required for the Corn Products Company and 5000 tons for Corporation improvements at Lorain and elsewhere. The St. Paul road has ordered 3000 tons more of bridge work.

There has been a sharp advance in Iron Skelp, due to the fact that leading consumers have made some large purchases during the past two weeks. The manufacturers of Merchant Pipe and of Tubes have again advanced prices \$2 per ton. The demand is active.

A Philadelphia foundry was the lowest bidder on the 38,000-ton Pipe contract for New Orleans. No award has yet been made.

A Comparison of Prices.

Advances Over the Previous Month in Heavy Type.
Declines in Italics.

At date, one week, one month and one year previous.

	Jan.30, 1907.	Jan.23, 1907.	Dec.26, 1906.	Jan.31, 1906.
FIG IRON, Per Gross Ton:				
Foundry No. 2, Standard, Philadelphia.....	\$26.50	\$26.50	\$25.00	\$18.50
Foundry No. 2, Southern, Cincinnati.....	26.00	26.00	26.00	16.75
Foundry No. 2, Local, Chicago.....	25.50	25.50	25.50	19.25
Bessemer, Pittsburgh.....	23.35	22.85	23.35	18.35
Gray Forge, Pittsburgh.....	22.50	22.25	22.85	17.35
Lake Superior Charcoal, Chicago.....	27.00	27.00	26.00	20.50

BILLETS, &c., Per Gross Ton:				
Bessemer Billets, Pittsburgh.....	29.00	29.50	29.50	26.00
Forging Billets, Pittsburgh.....	36.00	36.50	36.50	32.00
Open Hearth Billets, Phila.....	33.00	33.00	34.00	29.00
Wire Rods, Pittsburgh.....	37.00	37.00	37.00	34.00
Steel Rails, Heavy, Eastern Mill	28.00	28.00	28.00	28.00

OLD MATERIAL, Per Gross Ton:				
Steel Rails, Melting, Chicago.....	18.00	18.00	18.50	16.50
Steel Ra'ls, Melting, Phila.....	18.75	19.00	20.00	17.50
Iron Rails, Chicago.....	27.00	27.00	28.00	23.00
Iron Rails, Philadelphia.....	27.50	27.50	27.75	23.50
Car Wheels, Chicago.....	24.50	25.00	25.25	19.00
Car Wheels, Philadelphia.....	23.00	23.00	23.00	18.75
Heavy Steel Scrap, Pittsburgh..	18.50	18.50	20.00	16.75
Heavy Steel Scrap, Chicago.....	16.00	17.00	17.00	14.75
Heavy Steel Scrap, Philadelphia	18.50	18.00	19.50	17.00

FINISHED IRON AND STEEL,				
Per Pound:	Cents.	Cents.	Cents.	Cents.
Refined Iron Bars, Philadelphia.	1.93½	1.93½	1.83½	1.83½
Common Iron Bars, Chicago....	1.81½	1.81½	1.81½	1.75
Common Iron Bars, Pittsburgh.	1.80	1.80	1.80	1.80
Steel Bars, Tidewater, New York	1.74½	1.74½	1.74½	1.64½
Steel Bars, Pittsburgh.....	1.60	1.60	1.60	1.50
Tank Plates, Tidewater, New York	1.84½	1.84½	1.84½	1.74½
Tank Plates, Pittsburgh.....	1.70	1.70	1.70	1.60
Beams, Tidewater, New York...	1.84½	1.84½	1.84½	1.84½
Beams, Pittsburgh.....	1.70	1.70	1.70	1.70
Angles, Tidewater, New York..	1.84½	1.84½	1.84½	1.84½
Angles, Pittsburgh.....	1.70	1.70	1.70	1.70
Skelp, Grooved Steel, Pittsburgh	1.80	1.65	1.65	1.57½
Skelp, Sheared Steel, Pittsburgh.	1.90	1.70	1.70	1.60

SHEETS, NAILS AND WIRE,				
Per Pound:	Cents.	Cents.	Cents.	Cents.
Sheets, No. 27, Pittsburgh.....	2.50	2.50	2.50	2.30
Wire Nails, Pittsburgh.....	2.00	2.00	2.00	1.85
Cut Nails, Pittsburgh.....	2.05	2.05	2.05	1.75
Barb Wire, Galv., Pittsburgh...	2.45	2.45	2.45	2.30

METALS, Per Pound:				
Lake Copper, New York.....	24.75	24.75	23.50	18.12½
Spelter, New York.....	7.00	7.00	6.67½	6.00
Spelter, St. Louis.....	6.75	6.75	6.55	6.00
Lead, New York.....	6.30	6.30	6.30	5.75
Lead, St. Louis.....	6.10	6.12½	6.05	5.55
Tin, New York.....	41.87½	42.00	42.80	36.75
Antimony, Hallett, New York...	24.50	24.50	25.00	14.25
Nickel, New York.....	45.00	45.00	45.00	40.00
Tin Plate, 100 lb., New York...	\$4.09	\$4.09	\$4.09	\$3.69

Chicago.

FISHER BUILDING, January 30, 1907.—(By Telegraph.)

No features of unusual interest or significance have developed either in Finished or Crude products, and such price changes as have taken place have had an upward tendency in all lines, save in Old Material. With no impelling need to force them into the market, it was hardly to be expected that for the present, at least, consumers of Pig Iron would hasten to buy second half requirements, and necessary concessions from dealers that would invite such purchases are being withheld. Under such conditions any immediate buying movement involving large tonnages can hardly be anticipated. Nevertheless, the Pig Iron market is well sustained by a surprisingly large demand from jobbing foundry interests and small consumers. It is difficult to quote prices on furnace products that will accurately represent the market for the reason that quotations of each separate interest are governed by circumstances peculiar to its individual position as respects amounts of unsold tonnage and the character and source of inquiries. The quotation of \$19, Birmingham, for No. 2 Foundry, however, fairly represents the general price level for the second half. The advance announced for Blue and Galvanized Sheets, effective January 24, was foreshadowed by a strong and increasing demand that has resulted in great scarcity and consequent slow deliveries. A rise of one point in Merchant Pipe, which practically restores the price of 1903, together with a like advance in Boiler Tubes, is noted. Protest against the enforcement of the new freight rate on Southern Iron, announced to take effect on February 1, is growing in force and emphasis. At a meeting of the Illinois Manufacturers'

Association, held in Chicago to-day, resolutions were passed protesting against any increase of the present rate. A committee was appointed to wait upon the railroads and ask for a withdrawal of the present order.

Pig Iron.—The hesitancy on the part of large consuming interests to cover their requirements for the second half at prevailing prices and the unyielding attitude of furnacemen respecting unsold tonnage for that period have resulted in an entire absence of market activity, so far as sales of significant magnitude are concerned. There are still in the market two large inquiries, one of 10,000 and one of 15,000 tons, for last half delivery, which could no doubt be quickly closed at a definite shading of present prices, but unless a radical change occurs in the views of selling agencies there is no immediate prospect of sales for these tonnages being consummated. The existing situation seems to be a logical result of manufacturing interests having requirements well covered through the first half, and the furnaces, on the other hand, having sold a large enough percentage of their output to encourage them in holding firm on the remainder. This does not mean, of course, that furnace schedules for the second half are anywhere near completed, for there is undoubtedly a large tonnage yet to be marketed. Present conditions, however, seem to justify the waiting attitude now assumed by both sides. Activity in small lots ranging from 200 to 500 tons for third quarter, and even through the full second half, is pronounced, and the aggregation of such tonnages is large enough to keep the market strong. While \$23.50 to \$23.75 at furnace for Northern No. 2 Foundry is reported to have been made, other important interests are declining orders at anything below \$24. Recent sales of Southern Foundry indicate that \$23, Birmingham, for first quarter, and \$22 for second quarter represent the average ruling on current transactions. For last half \$19, Birmingham, is strongly held, though this price is probably being shaded 50c. a ton on off brands. Orders for spot iron are increasing plentifully, and, barring delays by high water, deliveries are being made with reasonable promptness. As indicated by actual sales for early deliveries, prices named in the schedule below are nearer to the outside than the inside figures. Quotations for February and March shipments, f.o.b. Chicago, including the 45c. advance in freight rates effective February 1, on Southern grades, are as follows:

Lake Superior Charcoal.....	\$27.00 to \$27.50
Northern Coke Foundry, No. 1.....	26.00 to 26.50
Northern Coke Foundry, No. 2.....	25.50 to 26.00
Northern Coke Foundry, No. 3.....	25.50 to 26.00
Northern Scotch, No. 1.....	26.00 to 27.00
Ohio Strong Softeners, No. 1.....	26.00 to 26.50
Ohio Strong Softeners, No. 2.....	25.50 to 26.00
Southern Coke, No. 1.....	27.35 to 27.85
Southern Coke, No. 2.....	26.85 to 27.35
Southern Coke, No. 3.....	26.35 to 26.85
Southern Coke, No. 4.....	25.85 to 26.35
Southern Coke, No. 1 Soft.....	27.35 to 27.85
Southern Coke, No. 2 Soft.....	26.85 to 27.35
Southern Gray Forge.....	25.85 to 26.35
Southern Mottled.....	22.85 to 23.35
Malleable Bessemer.....	26.00 to 26.50
Standard Bessemer.....	25.30 to 25.80
Jackson Co. and Kentucky Silvery, 6 %	29.30 to 29.80
Jackson Co. and Kentucky Silvery, 8 %	31.30 to 31.80
Jackson Co. and Kentucky Silvery, 10 %	33.30 to 33.80

Old Metals.—So long as prices maintain their present altitude there is not much likelihood of marked change in the method of hand to mouth buying, which now prevails. The scarcity of Lake and Casting Copper heretofore noted still exists. We quote, as follows: Casting Copper, 26½c. to 27c.; Lake, 27c. to 27½c., in car lots for prompt shipment; small lots, ¼c. to ½c. higher; Pig Tin, car lots, 44½c.; small lots, 45c.; Lead, Desilverized, 6.50c. to 6.60c., for 50-ton lots; Corroding, 7.25c. to 7.35c., for 50-ton lots; on car lots, 2¼c. per 100 lb. higher; Spelter, 6.90c.; Cookson's Antimony, 28½c., and other grades, 26½c. to 27½c.; Sheet Zinc is \$8.40 list, f.o.b. La Salle, in car lots of 600-lb. casks. On Old Metals we quote: Copper Wire, 20½c.; Heavy Copper, 20¼c.; Copper Bottoms, 19½c.; Copper Clips, 20c.; Red Brass, 19½c.; Red Brass Borings, 16½c.; Yellow Brass, 16c.; Yellow Brass Borings, 14½c.; Light Brass, 12½c.; Lead Pipe, 5.50c.; Tea Lead, 5c.; Zinc, 5c.; Pewter, No. 1, 28c.; Tin Foil, 34c.; Block Tin Pipe, 27½c.

(By Mail.)

Billets and Rods.—Because of scarcity at all sources of supply transactions in Rods are practically confined to small lots. No sales of considerable tonnage are reported, but for carload lots \$36 to \$37, Pittsburgh, is still quoted. It is likely that for urgent requirements from \$1 to \$2 a ton above these prices is in some cases obtained. The same conditions, to a large extent, govern the movement of Forging Billets, which are still held at \$38, with the usual advance according to size.

Rails and Track Supplies.—Numerous orders for Light Rails are being booked, which though not conspicuous for tonnage volume, constitute on the whole a satisfactory business. Angle Bars, Bolts and Spikes are in good demand, and though no advances are reported, prices are firm at quotations named. We quote as follows: Angle Bars, accompanying,

Rail orders, 1907 delivery, 1.65c.; car lots, 1.90c.; Spikes, 2.25c. to 2.50c., according to delivery; Track Bolts, 2.65c. to 2.75c., base, Square Nuts, and 2.80c. to 2.90c., base, Hexagon Nuts. The store prices on Track Supplies range from 0.15c. to 0.20c. above mill prices. Light Rails, 30 to 45 lb. sections, \$33; 25-lb., \$34; 20-lb., \$33; 16-lb., \$36; 12-lb., \$37, f.o.b. mill. Standard Sections, \$28, f.o.b. mill, full freight to destination.

Structural Material.—Due largely to heavy specifications from car building interests and other industrial concerns, Structural mills are now running full. With orders in hand and in sight it would seem that a full measure of present activity is assured for some time to come. It is expected also that a renewal of building operations, which will include the construction of a number of large buildings requiring Structural Shapes, will soon take place, and orders from this source will strongly supplement those now in hand. The Corn Products Company will require for the construction of its new plant between 10,000 and 12,000 tons of Steel, 4500 tons of which has just been placed. Prices from store are quoted without change at 2.05c. to 2.10c., and mill prices are as follows: Beams and Channels, 3 to 15 in., inclusive, 1.86½c.; Angles, 3 to 6 in., ¼-in. and heavier, 1.86½c.; larger than 6 in. on one or both legs, 1.90½c.; Beams, larger than 15 in., 1.96½c.; Zees, 3 in. and over, 1.86½c.; Tees, 3 in. and over, 1.91½c., in addition to the usual extras for cutting to extra lengths, punching, coping, bending and other shop work.

Plates.—While the quotation of the Carnegie Steel Company remains at \$1.60, Pittsburgh, the fact that it is not in position to make deliveries of Sheared Plates for four months and of Universal Plates for the remainder of the year makes this price, of course, merely nominal. Outside mills are asking from \$2 to \$4 a ton above this price, according to the desirability of specifications and tonnage offered. The general demand is good, but no recent sales of notable size are reported. We quote for future deliveries as follows: Tank Plate, ¼-in. and heavier, wider than 6¼ and up to 100 in. wide, inclusive, car lots, Chicago, 1.76½c. to 1.96½c.; 3-16-in., 1.86½c. to 2.06½c.; Nos. 7 and 8 gauge, 1.91½c. to 2.01½c.; No. 9, 2.01½c. to 2.21½c.; Flange quality, in widths up to 100 in., 1.86½c. to 1.96½c., base, for ¼-in. and heavier, with the same advance for lighter weights; Sketch Plates, Tank quality, 1.86½c. to 1.96½c.; Flange quality, 1.96½c. Store prices on Plates are as follows: Tank Plate, ¼-in. and heavier, up to 72 in. wide, 2c. to 2.10c.; from 72 to 96 in. wide, 2.10c. to 2.20c.; 3-16-in., up to 60 in. wide, 2.10c. to 2.20c.; 72 in. wide, 2.35c. to 2.45c.; No. 8 up to 60 in. wide, 2.15c. to 2.25c.; Flange and Head quality, 0.25c. extra.

Sheets.—In view of the scarcity of Sheets that has existed for some time, and the fact that certain grades and gauges have been considered relatively out of line with other finished products, the recent advance of the American Sheet & Tin Plate Company, effective January 24, did not come as a surprise. Mills are well filled up on all kinds of Sheets, and production is hardly keeping pace with the volume of orders received. There is no improvement in deliveries on Galvanized, which, as heretofore reported, are delayed from seven to eight weeks. Prompt shipment in many cases still commands a premium of \$1 a ton. Quotations are revised as follows: Blue Annealed, No. 10, 2.01½c.; No. 12, 2.06½c.; No. 14, 2.11½c.; No. 16, 2.21½c.; Box Annealed, Nos. 17 to 21, 2.51½c.; Nos. 22 to 24, 2.56½c.; Nos. 25 and 26, 2.61½c.; No. 27, 2.66½c.; No. 28, 2.76½c.; No. 29, 2.86½c.; No. 30, 2.96½c.; Galvanized Sheets, Nos. 10 to 14, 2.81½c.; Nos. 15 and 16, 3.01½c.; Nos. 17 to 21, 3.16½c.; Nos. 22 to 24, 3.31½c.; Nos. 25 and 26, 3.51½c.; No. 27, 3.71½c.; No. 28, 3.91½c.; No. 30, 4.41½c. Sheets from store: Blue Annealed, No. 12, 2.30c.; No. 14, 2.35c.; No. 16, 2.45c.; Box Annealed, Nos. 18 to 21, 2.70c.; Nos. 22 to 24, 2.75c.; No. 26, 2.80c.; No. 27, 2.85c.; No. 28, 2.95c.; No. 30, 3.35c. Galvanized from store: Nos. 10 to 20, 3.30c. to 3.35c.; Nos. 22 to 24, 3.55c. to 3.60c.; No. 26, 3.65c. to 3.70c.; No. 27, 3.75c. to 3.95c.; No. 28, 4.10c.; No. 30, 4.65c. to 4.70c.

Bars.—While there is no change in Bars of either Iron or Steel, present prices are being firmly held, and orders are plentiful. Sales in lots ranging up to 1000 tons are reported, and specifications on old contracts are being urged for shipment. The mills, so far, are keeping well abreast of the demand, and but little complaint of unreasonably delayed shipments is heard, except that occasioned by meager transportation facilities. Prices remain unchanged, 1.81½c., Chicago, being quoted for Iron Bars, though desirable orders can still be placed at a shade of \$1 on a ton. Quotations are as follows: Iron Bars, 1.81½c. to 1.86½c.; Steel Bars, 1.76½c., both half extras; Hoops, 2.16½c., extras as per Hoop card; Bands, 1.76½c., as per Bar card, half extras; Soft Steel Angles and Shapes, 1.86½c., half extras. Store prices are as follows: Bar Iron, 2.10c. to 2.25c.; Steel Bars, 2c. to 2.10c.; Steel Bands, 2c., as per Bar card, half extras; Soft Steel Hoops, 2.35c. to 2.45c., full extras.

Merchant Pipe.—No previous intimation was had of

the one point advance announced this week in Pipe, though in view of the strong upward tendency in crude material it cannot be said to have been entirely unexpected. Despite the usual expectation of dullness at this season of the year there is no diminution in demand, and stocks are more or less broken. Discounts on car lots, Chicago, are revised as follows: Black Steel Pipe, 74.35 on the base sizes, $\frac{3}{4}$ to 5 in., and Galvanized, 64.35. From store in small lots, Chicago jobbers now quote $72\frac{1}{2}$ per cent. on Black Steel Pipe, $\frac{3}{4}$ to 6 in. Iron Pipe is held in advance from four to five points above these prices.

Boiler Tubes.—An activity in jobbing boiler shops that is somewhat unusual for this season of the year is responsible for the continuance of a strong demand for Merchant Tubes. The advance of one point noted in Pipe is also effective on Tubes for mill shipment. Revised mill quotations are as follows on the base sizes: $2\frac{3}{4}$ to 5 in., in car-load lots, Steel Tubes, 65.35; Iron, 52.35; Seamless, 49.35; $2\frac{1}{2}$ in. and smaller, and lengths over 18 ft., and $2\frac{1}{2}$ in. and larger, and lengths over 22 ft., 10 per cent. extra. Store prices are, however, unchanged, as follows:

	Steel.	Iron.	Seamless.
1 to $1\frac{1}{2}$ in.	40	35	$42\frac{1}{2}$
$1\frac{3}{4}$ to $2\frac{1}{4}$ in.	50	35	35
$2\frac{1}{2}$ in.	52	35	30
$2\frac{3}{4}$ to 5 in.	60	$47\frac{1}{2}$	$42\frac{1}{2}$
6 in. and larger.	50	35	..

Merchant Steel.—No complaint of dearth of orders is heard on any hand, and specifications are being freely given. No change is noted as to deliveries, which, as compared to other lines, is quite satisfactory, and prices remain unchanged except for an advance on Smooth Finished Machinery Steel, which has been advanced to $2.16\frac{1}{2}$ ¢. Quotations are as follows: Planished or Smooth Finished Tire Steel, $1.96\frac{1}{2}$ ¢; Iron Finish, up to $1\frac{1}{2}$ x $\frac{1}{2}$ in., $1.91\frac{1}{2}$ ¢; Iron Finish, $1\frac{1}{2}$ x $\frac{1}{2}$ in. and larger, $1.76\frac{1}{2}$ ¢, base; Channels for solid rubber Tires, $\frac{3}{4}$ to 1 in., $2.26\frac{1}{2}$ ¢, and $1\frac{1}{2}$ in. and larger, $2.16\frac{1}{2}$ ¢; Smooth Finished Machinery Steel, $2.16\frac{1}{2}$ ¢; Flat Sleigh Shoe, $1.71\frac{1}{2}$ ¢; Concave and Convex Sleigh Shoe, $2.06\frac{1}{2}$ ¢; Cutter Shoe, 2.35 ¢; Toe Calk Steel, $2.31\frac{1}{2}$ ¢; Railroad Spring, $1.96\frac{1}{2}$ ¢; Crucible Tool Steel, $6\frac{1}{2}$ ¢ to 8¢, and still higher prices are asked on special grades. Shafting, 50 per cent. off in car lots and 45 per cent. in less than car lots, in base territory.

Cast Iron Pipe.—No business of significant volume has developed, but a lot of smaller orders has helped to make a sizable and satisfactory volume of business. The New Orleans order, amounting to 38,000 tons, which was to have been let January 23, has not yet been placed, and it is considered doubtful if any action will be taken at the present time, especially for the majority of the requirements, which will not be needed until next year. We quote: Water Pipe, 4 in., \$37 to \$38; 6, 8, 10 and 12 in., \$36 to \$37; over 12 in., \$35 to \$36, with \$1 extra for Gas Pipe.

Coke.—As was anticipated, some difficulty has been experienced in the movement of Coke from Southern and Southeastern points on account of interference with transportation facilities, caused by recent floods. This was, however, of short duration, and did not prove serious. Connells-ville 72-hr. Coke is quoted at \$4.25 and \$4.50 for car lots at the ovens; By-Product, \$7.15 f.o.b. Chicago, prompt delivery.

Old Material.—With mills and melters well stocked and only buying sparingly when attractions are offered, there is an utter lack of boosting influence to the sagging condition of the Scrap market. Anxiety of dealers to dispose of stock had led to some further decline in some lines, and some recent railroad offerings have met with slow response. Heavy Melting Steel Scrap is off \$1 a ton from last week, and there is a decided tone of weakness all along the line. The following quotations are on gross ton lots, f.o.b. Chicago:

Old Iron Rails.	\$27.00 to \$28.00
Old Steel Rails, 4 ft. and over.	19.00 to 19.50
Old Steel Rails, less than 4 ft.	18.00 to 18.50
Heavy Relaying Rails, subject to inspection, 50 lb. and under.	31.00 to 32.00
Old Car Wheels.	24.50 to 25.00
Heavy Melting Steel Scrap.	16.00 to 16.50
Frogs, Switches and Guards.	17.00 to 17.50
Mixed Steel.	14.50 to 15.00

The following quotations are per net ton:

Iron Fish Plates.	\$22.00 to \$22.50
Iron Car Axles.	26.50 to 27.00
Steel Car Axles.	22.00 to 22.50
No. 1 Railroad Wrought.	16.00 to 16.50
No. 2 Railroad Wrought.	15.00 to 15.50
Railway Springs.	16.00 to 16.50
Locomotive Tires, smooth.	16.00 to 16.50
No. 1 Dealers' Forge.	12.50 to 13.00
Mixed Busheling.	11.50 to 12.00
Iron Axle Turnings.	11.00 to 11.50
Soft Steel Axle Turnings.	11.00 to 11.50
Machine Shop Turnings.	11.00 to 11.50
Cast Borings.	8.75 to 9.00
Mixed Borings, &c.	8.75 to 9.00
No. 1 Mill.	10.50 to 11.00
No. 2 Mill.	9.50 to 10.00
No. 1 Boilers, cut to Sheets and Rings.	12.00 to 12.50
No. 1 Cast Scrap.	18.00 to 18.50
Stove Plate and Light Cast Scrap.	14.00 to 14.50
Railroad Malleable.	16.00 to 16.50
Agricultural Malleable.	15.00 to 16.00

Pittsburgh.

PARK BUILDING, January 30, 1907.—(By Telegraph.)

Pig Iron.—The market has been rather quiet the past week, only a limited tonnage having been sold. The No. 5 Furnace of the Jones & Laughlin Steel Company has gone out for repairs, making two Eliza furnaces idle, and the company will probably be a buyer of Bessemer Iron. None of the large Steel interests is taking in any Bessemer at the present time, and as a result the supply is larger and Bessemer for early delivery is much more easily obtainable. We note small sales for prompt delivery at \$22.50 to \$23 at Valley furnace, also about 7000 tons of Malleable Bessemer and Basic for second quarter at \$22 at furnace and 5000 tons of Malleable Bessemer for third quarter at \$21 at Valley furnace. We quote Bessemer Iron for prompt shipment at \$22.50 to \$23, for second quarter delivery, \$22, and for second half delivery, \$21.50, Valley furnace. There is a fair demand for Foundry Iron, Northern grades of No. 2 being held at \$24 to \$25, Valley furnace, for prompt shipment, and \$22.50 to \$23, Valley furnace, for second quarter delivery. We note a sale of 1000 tons of Northern Forge at \$22.50, delivered Pittsburgh.

Steel.—The Steel situation has eased up considerably as regards supply, and while prices are easier the market is firm. We quote Bessemer Billets at \$29 to \$29.50, and Open Hearth about \$32, Pittsburgh. We quote Sheet and Tin Bars in random lengths at about \$30, Pittsburgh.

(By Mail.)

The week under review has been marked by an advance of \$2 a ton on Pipes, Tubes and Casing, \$2 a ton on Galvanized Sheets, \$1 a ton on Blue Annealed Sheets and 10c. per square on Galvanized Roofing Sheets, the advances on Galvanized Sheets and Roofing being due to the high prices ruling for Spelter. As noted last week, the supply of Bessemer Pig Iron for second and third quarter delivery seems to be larger, and the prices are showing an easier tendency. The demand for Basic and Malleable Bessemer for forward delivery is quite active, prices ruling at about \$22, Valley furnace, for shipment up to July. While Bessemer and Open Hearth Steel are more plentiful, prices are firm, but the new tonnage being bought is relatively small. Ferromanganese is being offered at lower prices, quotations as low as \$70, Pittsburgh, having recently been made. Structural Steel and Plates are quite active, especially the latter. Scrap continues weak and the demand is light.

Ferromanganese.—Prices have shown a sharp decline the past week and we now quote 80 per cent. foreign Ferro for prompt delivery at \$75 to \$77, Pittsburgh. For forward delivery quotations as low as \$70 to \$72, Pittsburgh, have been sent out.

Muck Bar.—The demand is greater than the supply and prices are very firm. As a rule makers of Muck Bar need their entire output for their own finishing mills, and this leaves but little tonnage available for the open market. We quote best grades of Muck Bar, made from all Pig Iron, at about \$36, Pittsburgh, while that made from part Scrap is held at \$32 to \$33, Pittsburgh.

Rods.—We quote Bessemer Rods at \$37 to \$38 and Open Hearth about \$39, Pittsburgh. Rods continue very scarce and higher prices have been paid for prompt shipment.

Skelp.—Heavy purchases of Iron Skelp by leading consumers in the past two or three weeks have caused a sharp advance in prices, and we have revised our quotations to a somewhat higher basis. We quote: Grooved Steel Skelp, 1.80c. to 1.85c.; Sheared Steel Skelp, 1.90c. to 2c.; Grooved Iron Skelp, 2.05c. to 2.10c.; Sheared Iron Skelp, 2.20c. to 2.30c., f.o.b., Pittsburgh. We note sales of upward of 10,000 tons of Grooved Iron Skelp on the basis of 2.05c. to 2.10c., Pittsburgh. Steel Skelp is very scarce, and for prompt delivery would probably command higher prices than are quoted above.

Steel Rails.—While inquiries for Standard Sections are quite heavy, the actual tonnage being placed is rather light, the Carnegie Steel Company having taken only about 8000 tons in the past week and about 15,000 tons of Light Rails. We quote Light Rails as follows: \$33 to \$34 for 20 to 45 lb.; \$34 to \$35 for 16-lb., and \$35 to \$36 for 12-lb., at mill. Angle Splice Bars are held at 1.65c., and Standard Section Rails at \$28, at mill.

Structural Material.—Inquiries continue active, and the actual tonnage being placed is larger than last month. The American Bridge Company has recently taken considerable tonnage in bridge work, mostly for Western roads. The McClintic-Marshall Construction Company has secured contracts for riveted truss bridge work for the Chicago, Milwaukee & St. Paul, included in which is one 150-ft. span,

one 180-ft. span and four 130-ft. spans; also some bridge work for the Great Northern, which includes five 200-ft. riveted spans, and some Steel buildings for the Westinghouse Electric & Mfg. Company, at East Pittsburgh, of about 2000 tons. Inquiries for small quantities are quite numerous, particularly for manufacturing plants. The market is firm, and we quote: Beams and Channels, up to 15-in., 1.70c.; over 15-in., 1.80c.; Angles, 3 x 2 x 1/4 in. thick up to 6 x 6 in., 1.70c.; 8 x 8 and 7 x 3 1/2 in., 1.80c.; Zees, 3-in. and larger, 1.70c.; Tees, 3-in. and larger, 1.75c. Under the Steel Bar card, Angles, Channels and Tees under 3-in. are 1.60c., base, for Bessemer and Open Hearth, subject to half extras on the Standard Steel Bar card.

Plates.—New business continues heavy, some large orders having been given out recently by Pipe mills for Plates to be used in the building of gas and oil lines. The Steel car interests continue to use an enormous tonnage, while the demand from boiler shops and other consumers is also active. Premiums of \$2 to \$3 a ton on Plates for prompt shipment continue to be asked by Eastern mills, but so far the amount actually placed at such prices is relatively small. Prices are very firm, and we quote: Tank Plate, 1/4 in. thick, 6 1/4 in. up to 100 in. wide, 1.70c. to 1.80c., base, at mills, Pittsburgh. Extras over this price are as follows:

	Extra per 100 lb.
Gauges lighter than 1/4-in. to and including 3-16-in.	
Plates on thin edges.....	\$0.10
Gauges Nos. 7 and 8.....	.15
Gauge No. 9.....	.25
Plates over 100 to 110 in.....	.05
Plates over 110 to 115 in.....	.10
Plates over 115 to 120 in.....	.15
Plates over 120 to 125 in.....	.25
Plates over 125 to 130 in.....	.50
Plates over 130 in.....	1.00
All sketches (excepting straight taper Plates varying not more than 4 in. in width at ends, narrowest end being not less than 30 in.).....	.10
Complete Circles.....	.20
Boiler and Flange Steel Plates.....	.10
"A. B. M. A." and ordinary Firebox Steel Plates.....	.20
Still Bottom Steel.....	.30
Marine Steel.....	.40
Shell Grade of Steel is abandoned.	

TERMS.—Net cash 30 days. For anticipated payments a maximum discount may be allowed at the rate of 6 per cent. per annum and for a longer time than 30 days interest shall be charged at the same rate per annum. Invoices paid within 10 days from date thereof, discount of 1/4 of 1 per cent. is allowable. Pacific Coast base, 1.60c., f.o.b. Pittsburgh, with all rail tariff rate of freight to destination added, no reduction for rectangular shapes 14 in. wide down to 6 in. of Tank, Ship or Bridge quality.

Sheets.—Effective January 24, both the American Sheet & Tin Plate Company and the independent mills announced an advance of \$2 a ton on Galvanized Sheets, \$1 a ton on Blue Annealed Sheets, and 10c. a square on Galvanized Roofing Sheets. The demand for both Black and Galvanized Sheets has been extremely heavy for a long time, and the continued high prices of Steel and the recent sharp advances in Spelter are responsible for the advances just announced. Leading Sheet mills are practically filled up for the next three or four months and are much behind in deliveries. We have revised our quotations to conform to the new prices, and now quote: Blue Annealed Sheets, No. 10 gauge and heavier, 1.85c.; Nos. 11 and 12, 1.90c.; Nos. 13 and 14, 1.95c.; Nos. 15 and 16, 2.05c.; Box Annealed, Nos. 17 to 21, 2.35c.; Nos. 22 to 24, 2.40c.; Nos. 25 and 26, 2.45c.; No. 27, 2.50c.; No. 28, 2.60c.; No. 29, 2.75c.; No. 30, 2.85c. We quote Galvanized Sheets as follows: Nos. 10 and 11, 2.65c.; Nos. 12 and 14, 2.75c.; Nos. 15 and 16, 2.85c.; Nos. 17 to 21, 3c.; Nos. 22 and 24, 3.15c.; Nos. 25 and 26, 3.35c.; No. 27, 3.55c.; No. 28, 3.75c.; No. 29, 4c., and No. 30, 4.25c. We quote No. 28 Gauge Painted Roofing Sheets at \$1.85 per square, and Galvanized Roofing Sheets, No. 28 gauge, \$3.25 per square for 2-in. corrugations. These prices are for carload lots, jobbers charging the usual advances.

Hoops and Bands.—Practically no new tonnage is being placed, but consumers are specifying liberally on old contracts, and shipments by the mills are heavy. We quote: Steel Hoops, 2c., and Bands for all purposes at 1.60c., base, half extras, as per Standard Steel card. These prices are for carload lots, f.o.b. Pittsburgh, plus full tariff rail rate to point of delivery, an advance of \$2 a ton being charged for less than carloads.

Tin Plate.—Leading mills are pretty well filled up for the first six months of this year, and considerable tonnage is being booked for third quarter delivery at an advance of 10c. a box over present prices. Shipments of Sheet and Tin mill products by American Sheet & Tin Plate Company in 1906 were more than 200,000 tons in excess of 1905, which is certainly a creditable record. At present four Tin Plate plants of the American Sheet & Tin Plate Company are idle, these being Star, Humbert, Morewood and Anderson, containing in all 29 hot mills. It is possible that the Star plant may not again be operated, as its location is such that extensions cannot be conveniently made. The supply of Tin Bars is better than for some time, and there is little complaint now from the mills over tardy deliveries. We quote \$3.90 per base box, f.o.b. Pittsburgh, for 14 x 20 100-lb. Cokes, terms 30 days, less 2 per cent.

off for cash in 10 days, on which price a rebate of 5c. a box is allowed for carload and larger lots.

Iron and Steel Bars.—We note a continued active demand for both Iron and Steel Bars, and the market is strong. The mills are getting out maximum output and are catching up on deliveries to some extent. We quote Refined Iron Bars at 1.80c., Pittsburgh, and Steel Bars at 1.60c., base, half extras, f.o.b. Pittsburgh, these prices being for forward delivery. For prompt shipment premiums of \$1 and \$2 a ton are asked.

Railroad Spikes.—The demand continues unusually heavy, and the leading makers are pretty well filled up with tonnage for the next two or three months or longer. We quote \$2.40 to \$2.50 per 100 lb. for forward delivery, while for prompt shipment \$2.65 to \$2.75 is quoted.

Merchant Steel.—The mills are catching up on deliveries to some extent, while the volume of new business being placed is rather light. Large consumers have their wants pretty well covered through first half of this year. Some irregularity in prices of Shafting is reported for delivery to certain points. The general market is firm, and we quote: Smooth Finished Machinery Steel, 1.85c. to 2c., depending on quality; Flat Sleigh Shoe, 1.65c. to 1.75c.; Cutter Shoe, 2.15c. to 2.20c.; Toe Calk Steel, 2.10c. to 2.15c.; Railroad Spring Steel, 1.75c. to 1.80c.; Crucible Tool Steel, 6c. to 8c., for ordinary grades, and 10c. and upward for special grades. The demand for Shafting is reported active, and prices are fairly well maintained. We quote Cold Rolled Shafting at 50 per cent. off in carloads and 45 per cent. in less than carloads, delivered in base territory.

Spelter.—The market continues active, sales of carloads having been made in the past week as high as 6.77 1/2c., Pittsburgh, and still higher prices are now being asked. We quote prime grades at 6.70c., St. Louis, equal to 6.82 1/2c., Pittsburgh, and it is likely the market will go still higher.

Pipes and Tubes.—The National Tube Company and other leading mills have announced another advance of one point on tubular goods, effective January 24. This is the fourth advance in prices of tubular goods made in the last four months. The first was two points, or \$4 a ton, on October 12, the second one point, or \$2 a ton, December 5, the same advance on December 20, and the fourth the same advance, effective last week, making a total advance of \$10 a ton over the low prices ruling prior to October of last year. The Philadelphia Company is in the market for its supply of tubular goods for 1907, embracing Merchant Pipe, Line Pipe and Casing, its inquiry amounting to about 4000 tons. The inquiry includes 100,000 ft. of 6 1/2-in. Casing, 30,000 ft. of 4-in. Tubing, 65,000 ft. of 3-in., 30,000 ft. of 2-in., 45,000 ft. of 8-in. Line Pipe, 60,000 ft. of 6-in. Line Pipe, 75,000 ft. of 2-in. Merchant Pipe, and 100,000 ft. of 1 1/2-in. Merchant Pipe. This tonnage is to be strictly all Iron, no Steel Skelp to be used. Among contracts placed is one for 10 miles of 12-in. Steel Line Pipe, taken by Spang, Chalfant & Co. An immense tonnage in gas and oil lines is being figured on, part of which has been placed, but is not ready for publication. The general demand continues heavy and the whole Pipe market is active and strong. The extreme discount on Merchant sizes of Steel Pipe now is 76 and 5 off and on Iron Pipe about 72 and 5 per cent. off, for 1/4 to 6 in., to the large trade. Official discounts on Steel Pipe, which are shaded about one point or more to the large trade, are as follows:

	Merchant Pipe.	
	Jobbers, carloads.	Steel.
	Black.	Galv.
1/4 to 1/2 in.....	67	61
3/8 in.....	69	55
1/2 in.....	71	59
3/4 to 6 in.....	75	65
7 to 12 in.....	70	55
Extra strong, plain ends:		
1/4 to 3/8 in.....	60	48
1/2 to 4 in.....	67	55
4 1/2 to 8 in.....	63	51
Double extra strong, plain ends:		
1/2 to 8 in.....	56	45

Boiler Tubes.—Effective January 24, prices of Boiler Tubes were advanced one point or \$2 a ton. New tonnage being placed with the mills has been heavy for some time, and some large inquiries are in the market. Prices are firm, and it is intimated they may be advanced again before very long. Boiler Tubes are low when compared with prices ruling for Pig Iron and Steel Billets. The new discounts are as follows:

	Boiler Tubes.	
	Iron.	Steel.
1 to 1 1/2 in.....	41	47
1 1/2 to 2 1/2 in.....	42	59
2 1/2 in.....	47	61
2 3/4 to 5 in.....	54	67
6 to 13 in.....	42	59

Iron and Steel Scrap.—The condition of the Scrap market is practically the same as noted last week. New buying continues light, and the tendency of prices is downward. In this condition it is hardly likely that large consumers will come in the market to buy until they are fully satisfied

that the bottom has been reached. We repeat the quotations of last week as follows: Heavy Melting Scrap, \$18.50, for Pittsburgh, Sharon or Steubenville delivery; No. 1 Wrought Scrap, \$19.50 to \$19.75; No. 2 Wrought Scrap, \$17.75 to \$18; Old Steel Rails, short pieces, 6 ft. and under, for Open Hearth purposes, \$18.50; Old Steel Rails, rerollers, \$20.50 to \$21; Wrought Iron Turnings, \$14.25 to \$14.50; Bundled Sheet Scrap, \$16.50 to \$16.75; New Tin and Terne Plate Clippings, \$18.50 to \$18.75 per net ton; Low Phosphorus Melting Stock, \$22.75 to \$23; Cast Iron Borings, \$12.25 to \$12.50; Old Car Wheels, \$21; Steel Axles, \$22.50; No. 1 Cast Scrap, \$20.25 to \$20.50; Grate Bars, \$15; Stove Plate, \$16, all per gross ton, f.o.b. Pittsburgh, unless otherwise specified.

Coke.—Shipments of Coke were demoralized last week by the heavy rains and washouts on the railroads. Furnace Coke for prompt shipment continues scarce, and is bringing high prices. Several producers who have Connellsville Coke for reasonably prompt shipment are holding it at \$3.65 to \$3.75 per ton, at oven, the highest figure reached for several years. Connellsville 72-hr. Foundry Coke for prompt delivery is held at \$4.25 to \$4.50 a ton, at oven. On contracts for delivery in the next six months Connellsville Furnace Coke is held at \$3.10 to \$3.25, and 72-hr. Foundry at \$4 to \$4.25, at oven. Coke made outside of the Connellsville region, known as Main Line and Mountain Coke, is offered at lower prices. The Upper and Lower Connellsville regions made last week 406,271 tons.

Cleveland.

CLEVELAND, OHIO, January 29, 1907.

Iron Ore.—The most important development of the week was the purchase of about 100,000 tons of Ore in the local market by an Eastern furnace. The purchaser succeeded in buying that amount by picking up a number of odds and ends from several dealers. The greater part of the tonnage secured is non-Bessemer Ore. The prevailing market price was paid. This is the first sale of a large tonnage in several weeks, although small sales of non-Bessemer Ore continue to be made. There is plenty of Siliceous Ore on the market, but the demand for it has improved somewhat. Bessemer Ore is very hard to find, none of the local dealers having any tonnage left to sell. A scarcity is predicted later in the season. Movement of Ore from the local docks has been seriously interfered with the past few days by the cold weather. Ore quotations at Lake Erie docks are as follows: Old Range Bessemer, \$5; Mesaba Bessemer, \$4.75; Old Range non-Bessemer, \$4.25; Mesaba non-Bessemer, \$4; Siliceous Bessemer, \$2.75; Siliceous non-Bessemer, \$2.50.

Pig Iron.—A slight lull has followed the heavy buying movement of the past two weeks, although there has been considerable Northern Foundry sold the past few days in small lots. Foundrymen in this city and vicinity are now pretty well covered for the last half. Those who have not yet bought will probably wait a while with the hope that prices may become a little lower. Higher prices are not expected unless the buying movement again becomes heavy, but the indications are that Iron the last half will not be any cheaper. Prices remain very strong, \$22 at Valley furnace being generally regarded as the established price for Northern Foundry No. 2. The market is so strong that furnaces refuse to consider an offer for less than that price. One local furnace received inquiries for about 20,000 tons from consumers outside of this territory during the past day or two, one of the inquiries being for about 12,000 tons. The furnace gave a quotation of \$22.50, Cleveland, that being the price for which local furnaces are holding. Among the inquiries for prices on local Iron are some from consumers in the Chicago District. One or two furnaces in this vicinity are reported to have changed from Bessemer to Foundry Iron, claiming that there is more profit in the latter at the present prevailing prices. The inquiries for Bessemer Iron have not been numerous. Some small sales have been made at \$22, Valley furnace. Some inquiry is still being made for foreign Iron by consumers who want prompt delivery. Some sales have been made and the immediate supply is entirely exhausted. Local dealers are now selling foreign Iron at \$26, Cleveland, and do not promise delivery until about March 1. Cargoes that have not yet been sold are expected in Philadelphia the latter part of February. Southern Iron is firm, most of the dealers holding for \$19, Birmingham, for No. 2 for the last half delivery. Quotations for the last half 1907, f.o.b. Cleveland, are as follows:

Bessemer	\$21.50 to \$22.00
Northern Foundry, No. 1	22.50 to 23.00
Northern Foundry, No. 2	22.00 to 22.50
Northern Foundry, No. 3	21.50 to 22.00
Southern, No. 2	22.85 to 23.35
Gray Forge	21.00 to 21.50

Coke.—The market is quiet and prices are not so firm. Foundries have pretty well covered for the first half. Foundry Coke is selling at \$4 to \$4.25 at oven for first half and prompt shipment. Furnace Coke is quoted at \$3.50 to \$3.75 at oven.

Finished Iron and Steel.—Specifications are still coming in heavily, especially for Plates and Shapes, the boiler and structural shops requiring large quantities of these materials. Prices are strong and some advances have been made. Jobbers report a heavy demand for everything for prompt shipment, but for future delivery the mills have contracted for only a small amount of business the past week. Deliveries show no improvement, and they seem to be a little worse in Sheets, shipments not being promised within four months. Plates are very strong, there having been an unusual demand for them during January, and the mills are further behind than they were the first of the month. Not much business is being contracted for for last half delivery, although the mills accept the orders that come to them. Some of the mills expect soon to begin soliciting contracts for the last half. Consumers as a rule do not think prices will be higher, and believe that they may go lower. For that reason they see no reason for making contracts at the present time for the last half. The Bar mills are all loaded up and Bars are still hard to get for prompt shipment, except at the smaller mills at premium prices. Steel Bars are in heavy demand, and the small mills are getting from \$2 to \$3 premium for them for quick delivery. One Pittsburgh mill has made a further advance in Plates, and is asking 2.10c., Pittsburgh, for them for prompt shipment. Not many orders, however, are being booked at that price. Most of the mills are now asking 1.80c., Pittsburgh, for Plates, and that seems to be the established price in this market for fairly good delivery. Billets are the only finished material that show weakness. Some of the Billet mills are getting caught up, and Forging Billets are now quoted at \$34 to \$35, Cleveland. Rerolling Billets are also lower. There is a good demand for Steel and Iron Pipe and Boiler Tubes, and both are hard to get. Some of the mills have taken 1 point off the discount on Boiler Tubes, which amounts to an increase in price of between 2½ and 3 per cent. Stock prices have also been slightly advanced for Pipe and Boiler Tubes. Structural Material is in fair demand, but mills could stand heavier specifications. Because of the advance in Sheets, announced last week, local jobbers have advanced warehouse prices on Blue Annealed and Galvanized. Local stock prices are now as follows: Blue Annealed No. 10, 2.30c.; No. 28 One Pass Cold Rolled, 2.90c.; No. 28 Galvanized, 4c.

Old Material.—The market is quiet and weak, with no indications of an immediate improvement. Prices on several kinds of Old Material are lower than a week ago, but dealers hope that the present cold weather will cause them to stiffen a little. It seems to be a waiting market, with few inquiries. The principal activity during the week has been in Stove Plate, although there has been some demand for Turnings and Drillings and Steel Scrap. The following are dealers' prices to the trade per gross ton, f.o.b. Cleveland:

Old Steel Rails	\$18.00 to \$18.50
Old Iron Rails	24.00 to 25.00
Steel Car Axles	21.50 to 22.00
Old Car Wheels	21.50 to 22.00
Heavy Melting Steel	16.50 to 17.25
Railroad Malleable	18.00
Agricultural Malleable	16.00
Light Bundled Sheet Scrap	16.50 to 17.50

The following quotations are per net ton, f.o.b. Cleveland:

Iron Car Axles	\$29.75 to \$30.25
Cast Borings	10.00 to 10.50
Iron and Steel Turnings and Drillings	12.00 to 12.50
No. 1 Busheling	16.00
No. 1 Railroad Wrought	18.00 to 18.50
No. 1 Cast	17.50 to 18.50
Stove Plate	14.25 to 14.75
Tin Scrap, at factory	20.00

Cincinnati.

FIFTH AND MAIN STS., January 30, 1907.—(By Telegraph.)

Pig Iron.—There appears to be a little more interest manifested in the market for current delivery, and the sales during the week have been very satisfactory. Sales made covering the last half aggregate a heavy tonnage. Agricultural implement makers, Car Wheel works and in fact all melters along railroad lines have shown a disposition to do considerable buying to cover the entire year. This would indicate marked confidence in the situation as it is to-day and sanguine expectations for a continuance of existing high prices. The situation so far as regards car supply is no better, and the Southern lines have practically all of the sidings between this city and the southern terminal filled with northbound freight of various kinds that will take them some weeks to move and once more be in normal condition. There appears to be general dissatisfaction in regard to the advance of 25c. on freight, effective February 1, and considerable pressure has been brought to bear to defer action until some future date, which up to the present time has apparently been futile. As matters now stand, this advance will go into effect as per published schedule upon the date mentioned. Inquiry for Basic has been strong and a heavy tonnage of Malleable has been sold, of which 4500 tons for second and third quarter delivery went into St. Louis territory. One of the large car companies bought about 8000 tons of Soft Irons during

the week, and is now said to be in the market for quite a large tonnage of Wheel Iron. We note an inquiry for 2000 tons of Basic for February and March delivery. One of the large implement makers secured about 15,000 tons of Northern No. 2 Foundry for delivery covering the last half. A Malleable concern in Indiana bought 6000 tons of Malleable for the same delivery. In addition to these sales there have been a number of smaller transactions, representing from 500 to 1000 tons. Southern No. 2 remains practically as quoted last week, \$23 to \$23.50 for spot and running through first quarter, \$21 to \$22 for second quarter and \$18.50 to \$19 for last half, Birmingham, Northern No. 2 is quotable from \$21 to \$22 for last half, Hanging Rock Furnace, and there appears to be a very limited tonnage available for delivery prior to July 1, with sales made on a basis of \$25 at furnace. Freight rates from Hanging Rock District to Cincinnati are \$1.15, and from Birmingham, \$3. After February 1 add 25c. to schedule below, on account of the advance in freight rates from Birmingham. We quote, f.o.b. Cincinnati:

Southern Coke, No. 1.....	\$26.50 to \$27.00
Southern Coke, No. 2.....	26.00 to 26.50
Southern Coke, No. 3.....	25.50 to 26.00
Southern Coke, No. 4.....	25.00 to 25.50
Southern Coke, No. 1 Soft.....	26.50 to 27.00
Southern Coke, No. 2 Soft.....	26.00 to 26.50
Southern Coke, Gray Forge.....	23.00 to 23.50
Southern Coke, Mottled.....	22.00 to 22.50
Ohio Silvery, 8 per cent. Silicon.....	31.15 to 31.65
Lake Superior Coke, No. 1.....	26.65 to 27.15
Lake Superior Coke, No. 2.....	26.15 to 26.65
Lake Superior Coke, No. 3.....	25.65 to 26.15

Car Wheel Irons.

Standard Southern Car Wheel.....	\$29.00 to \$29.50
Lake Superior Car Wheel.....	27.50 to 28.00

Coke.—This market is perhaps a little more quiet, contract business being mostly in evidence, with shipments delayed considerably on account of scarcity of cars. Prices are apparently firm and unchanged. We quote the best brands of Connellsville and Virginia Foundry from \$4 to \$4.50, f.o.b. ovens.

Finished Iron and Steel.—While there is considerable tonnage booked ahead, the outlook is somewhat easier. We quote, f.o.b. Cincinnati, as follows: Iron Bars, in carload lots, 1.93c., with half extras; the same, in smaller lots, 2.10c., with full extras; Steel Bars, in carload lots, 1.73c., with half extras; the same, in smaller lots, 1.95c., with full extras; Base Angles, 1.83c., in carload lots; Beams and Channels, in carload lots, 1.83c., Plates, ¼-in. and heavier, 1.83c., in carload lots; in smaller lots, 2c.; Sheets, 16 gauge, in carload lots, 2.15c.; in smaller lots, 2.70c.; 14 gauge, in

carload lots, 2.05c.; in smaller lots, 2.60c.; Steel Tire, 1 x ¼ in. or heavier, 1.93c., in carload lots.

Old Material.—The market is well maintained, the demand being fairly strong and prices firm and about the same as shown last week. We quote dealers' prices, f.o.b. Cincinnati, as follows:

No. 1 R. R. Wrought, net ton.....	\$17.75 to \$18.25
Cast Borings, net ton.....	9.50 to 9.75
Steel Turnings, net ton.....	11.75 to 12.75
No. 1 Cast Scrap, net ton.....	16.75 to 17.75
Old Iron Axes, net ton.....	26.75 to 27.75
Old Iron Rails, gross ton.....	27.00 to 27.50
Old Steel Rails, long, gross ton.....	19.25 to 20.25
Relaying Rails, 56 lb. and up, gross ton.....	28.75 to 29.75
Old Car Wheels, gross ton.....	22.75 to 23.25
Low Phosphorus Scrap, gross ton.....	21.25 to 21.75

The Woodstock Iron & Steel Corporation, Anniston, Ala., is putting its two furnaces into condition and expects to have one of them in operation by April 1 and the other about July 1. The combined output of these two stacks will be about 400 tons daily. Rogers, Brown & Co. are sales agents.

Birmingham.

BIRMINGHAM, ALA., January 27, 1907.

Pig Iron.—There has been practically no change in market conditions for the past three or four weeks, quotations remaining about as follows: Spot and remainder of first quarter, \$22.50 to \$24; second quarter, \$21 to \$22, and last half, \$18.50 to \$19. Prices seem as firm to-day as on the 1st of January, and while the buying is on a more limited scale than for some time past, this is attributed to the more conservative view many melters are taking of the situation. Notwithstanding the inadequate transportation facilities all the foundries have been able to secure sufficient iron to operate at record-breaking capacities, and in the meantime thousands of tons have accumulated in the yards of the furnace companies. In addition to this it is estimated by well posted iron men that there is at present more than 40 days' shipment of iron in transit, while ordinarily this will not exceed 10. With this accumulation and the constantly increasing producing capacity of the country, it is hard to understand how some buyers are still figuring that the supply does not exceed the demand. Spot iron is easier now than for several months, and can be had from every furnace in the district with possibly two exceptions. Demand for this, however, is less urgent, showing conclusively that the majority of melters are securing their supply more regularly than heretofore. On account of the embargo placed on pig

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Iron, owing to the recent floods, shipments to Northern points have been restricted this week, but this has been raised and railroads are accepting all business offered. No relief was granted by the Southern Iron Committee at its meeting at Palm Beach, Fla., this week, and the advance of 25 cents per ton in freight to Mississippi and Ohio River crossings will go into effect on February 1, as originally announced.

Cast Iron Pipe.—R. D. Wood & Co. of Philadelphia were the lowest bidders for the 38,000 tons of Water Pipe let by the city of New Orleans during the past week. It is understood they will deliver the Pipe in their own schooners, this saving in freight enabling them to figure much closer than their less fortunate and not so favorably located competitors. Quotations on Water Pipe remain unchanged, and are approximately as follows: 4 to 6 in., \$35; 8 to 12 in., \$33; over 12-in. average, \$30, with \$1 per ton extra for Gas Pipe.

Old Material.—The market has been rather inactive during the past week, and is a shade weaker than for some time. For certain grades the demand continues good, but this is the exception rather than the rule. Dealers' stocks are small. Quotations are about as follows per gross ton, f.o.b. cars here:

Old Iron Rails.....	\$22.00 to \$22.50
Old Iron Axles.....	19.50 to 20.00
Old Steel Axles.....	17.50 to 18.50
Old Car Wheels.....	19.50 to 20.00
No. 1 Railroad Wrought.....	20.00 to 20.50
No. 2 Railroad Wrought.....	15.50 to 16.00
No. 1 Country Wrought.....	15.50 to 16.00
No. 2 Country Wrought.....	12.50 to 13.00
Wrought Pipe and Flues.....	13.00 to 13.50
Railroad Malleable.....	14.00 to 14.50
No. 1 Steel.....	15.00 to 15.50
No. 1 Machinery Cast.....	16.00 to 16.50
Stove Plate and Light Cast.....	12.00 to 12.50
Cast Borings.....	8.75 to 9.25

H. Hammond has resigned his position as assistant to the president and general sales agent of the Alabama Consolidated Coal & Iron Company to engage in business for himself. He has organized the Hammond-Byrd Company, to do a general brokerage business in Pig Iron, Steel, Coal and Coke. Wm. W. Bryd, Jr., is the other member of the firm, and both have been closely identified with the Iron industry here for the past seven years. Mr. Hammond retains his interest in the Imperial Coal & Coke Company and the Coosa Pipe & Foundry Company, and will continue as secretary and treasurer of both, as well as sales agent for the Shelby Iron Company.

The Payne & Joubert Foundry & Machine Company has secured the contract from the American Sugar Refining Company for castings to be used in the plant it is now constructing at Chalmette, La., at a cost of \$5,000,000, and which is to be the largest in the world. Among the castings are five vacuum pans, 14 ft. in diameter and weighing 250,000 lb. each. These are the heaviest castings ever attempted by a Southern foundry.

Philadelphia.

PHILADELPHIA, Pa., January 29, 1907.

The Iron and Steel markets are somewhat unsettled by reports from other centers, in which it is said that Pig Iron has suffered a decline. This may be so in some directions, and may be felt here in the not distant future, but it is certain that up to this date prices in this district have suffered no shrinkage whatever. Those who require Iron during the next three or four months have to shop around considerably before they can find anything for sale. When the discovery is made prices have to be arranged on the best terms possible, as there is no uniformity in quotations. Everything depends on where and when the delivery is to be made, and the relations which buyer and seller sustain to each other. Efforts are made to accommodate regular customers as far as possible, but others who are short of Iron have no alternative but to pay the prices demanded. This varies all the way from \$26.50 to \$27.50 for No. 2 X Foundry and \$25 to \$26 for Basic. There is perhaps a somewhat easier feeling as regards late deliveries, particularly those for the last quarter of the year, for which date makers are willing to accept business at comparatively low prices. This, however, cannot very well affect deliveries for the first half, on which furnaces are a long way behind, with little prospect of catching up in the near future. Still it is recognized that a great many things might happen before the end of the year, so that sellers are disposed to accept business on liberal terms, particularly for the fourth quarter, when bids are made by the right parties. Receipts of foreign Iron are at last beginning to make an impression, although there is a ready market for large tonnages at about \$22.50 for Middlesbrough No. 3, at which figure several thousand tons were sold in preference to storing. Charters have been made for five cargoes, amounting to about 25,000 tons additional, for shipment during February, which may relieve the market to a still greater extent than has yet been done. Low Phosphorus Iron is quiet, and sales have been made at \$26, at Lehigh

furnace for Western shipment. The feeling in trade circles is probably somewhat less confident than it has been, but so far there is no falling off in consumption or prospects of any so far as can be seen, so that while consumption keeps up at its present rate prices are not likely to change to any appreciable extent. The advance in freights and in Coal adds \$1 per ton to the cost of production, so that, as far as profits are concerned, the margin seems to be gradually getting smaller and smaller, although at the full prices now ruling there is no doubt a good return to the producer, but the costs are higher than they have been for many years.

Pig Iron.—Sales, although numerous, have not been for any very heavy tonnages. The chief anxiety is to get deliveries on what has already been contracted for. Furnaces are a long way behind as regards the Steel companies, and all the large concerns in this vicinity are running on a margin of not more than two or three days' material on hand. Sometimes at the close of one day they hardly know whether they will be able to run the day following unless material comes in during the night. This condition of affairs dominates the entire situation. The demand for deliveries late in the year appears to have dropped off considerably. What consumers want is something that they can depend upon as being deliverable during the next four or five months. The market is so bare, however, and the furnaces so far behind with their deliveries that there appears to be little prospect of easier conditions in the near future. It is probably safe to say that there has been no time yet when the stringency was so great as it is to-day. Prices for spot or 30-day shipments are therefore almost anything that a seller chooses to name, which for Basic would probably range from \$25 to \$25.50, and for No. 2 Foundry, which is almost equally as scarce, would be \$26.50 to \$27.50, possibly more, as the possibility of securing prompt Iron is altogether problematical, although of course those who have it can make their own terms. There is no falling off in consumption beyond what is due to the inability to secure material. Gray Forge is possibly a little easier, one lot of 2500 tons having been sold at \$22.25, delivered, March, April and May, although Standard Irons in smaller quantities would bring \$22.75 to \$23. It is just possible that the receipts of Foreign Iron will have some influence in the near future. For the past couple of months everything was sold to arrive and was taken in all sorts of lots from carloads up to 500 tons, at about \$23 on dock duty paid. To-day, however, a 2500 ton lot was sold at \$22.50 and with somewhat easier prices in Europe it is not unlikely that prices may be shaded down to the figure named. Scotch Iron is pretty well exhausted, and for the present is not offered for early delivery, although a little later on it is expected to come in at about \$25. Taking the situation in its entirety, it may be asserted that so far as this district is concerned prices have suffered no depreciation and are as strong as they have been at any time during the present movement. All the same, there is no question that consumers are disposed to be very conservative except as regards immediate deliveries to make up shortages, which appear to be increasing week by week. While prices are difficult to quote, the following are about the range for lots delivered in consumers' yards, eastern Pennsylvania and adjoining districts, according to dates named:

First Half 1907.

No. 2 X Foundry.....	\$26.50 to \$27.75
Standard Gray Forge.....	22.50 to 23.00
Basic.....	25.00 to 25.50
Low Phosphorus.....	27.00 to 27.50
Malleable.....	25.50 to 26.00
Middlesbrough No. 3, on dock.....	22.50 to 23.00
Scotch, on dock.....	25.00 to 25.25

Last Half 1907.

No. 1 X Foundry.....	\$26.00 to \$26.50
No. 2 X Foundry.....	24.00 to 24.50
No. 2 Plam.....	23.00 to 23.25
Standard Gray Forge.....	22.00 to 22.50
Basic.....	23.25 to 23.75
Low Phosphorus.....	26.50 to 27.00
Malleable.....	24.00 to 24.50

Ferroalloys.—There is as much unsettlement as ever in regard to prices of Ferro. The tendency appears to be toward lower figures, although prompt deliveries have been sold within the past few days at \$80, and at \$75 for March shipment. For the last half of the year extremely low prices are mentioned, but whether material can be had at the figure named is open to question. There would be no difficulty in buying at \$70 to \$71, but in some quarters it is said that \$2 or \$3 less could be done; but in the absence of sales \$70 to \$71 would probably be a fair quotation. Sales of 11 per cent. Spiegel have been made at about \$31 to \$31.50; Ferrosilicon at \$110 to \$112.

Steel.—The demand for Steel Billets is not specially active, but prices are firm at about the same figures as quoted last week—namely, \$33 to \$34 for Soft Steel and about \$36 to \$40 for Forging Steel. Mills have a great deal of business, which, however, is somewhat retarded by the difficulty of getting supplies of raw material.

Plates.—There is quite a scarcity of Plates for prompt shipment, and buyers are in many cases willing to pay premiums to secure deliveries earlier than they have contracted for. It is difficult to give the accommodation required, as the shortage is general, and to make earlier deliveries to

some, which could only be done to the disadvantage of others. The most difficult problem which the Plate mills have to solve is to secure deliveries of Pig Iron to enable them to make a full output. Prices are unchanged, as follows:

	Carload. Cents.	Part carload. Cents.
Tank, Bridge and Boat Steel.....	2.13 $\frac{1}{2}$	2.18 $\frac{1}{2}$
Flange or Boiler Steel.....	2.23 $\frac{1}{2}$	2.28 $\frac{1}{2}$
Marine.....	2.53 $\frac{1}{2}$	2.58 $\frac{1}{2}$
Locomotive Firebox Steel.....	2.63 $\frac{1}{2}$	2.68 $\frac{1}{2}$

The above are base prices for $\frac{1}{4}$ -in. and heavier. The following extras apply:

	Extra per 100 pounds.
3-16 in. thick.....	\$.10
Nos. 7 and 8, B. W. G.....	.15
No. 9, B. W. G.....	.25
Plates over 100 to 110 in.....	.05
Plates over 110 to 115 in.....	.10
Plates over 115 to 120 in.....	.15
Plates over 120 to 125 in.....	.25
Plates over 125 to 130 in.....	.50
Plates over 130 in.....	1.00

Structural Material.—There is nothing very important as regards individual transactions, but the demand for small and medium sized lots is very satisfactory and keeps the mills fully employed. Prices are unchanged, as follows: 1.83 $\frac{1}{2}$ c. to 2c. for Beams, Channels and Angles, according to specifications.

Bars.—There is a steady demand for Bars at fairly uniform prices, 1.93 $\frac{1}{2}$ c. for Best Refined Iron being the usual figure. Some claim to get a little more, and it may be that a slight shading is done by mills that can only make a few sizes. The general situation is very good, however, specifications coming in quite freely and giving the mills all the work they can handle. Steel Bars are nominally 1.83 $\frac{1}{2}$ c., but deliveries are so uncertain that buyers prefer to pay a little more for guaranteed shipments.

Sheets.—The Sheet trade is quite active, and some large orders have been placed during the past few days on which deliveries are called for with as much speed as possible. Prices as follows are unchanged as last quoted for mill shipments, and a tenth additional for smaller quantities: Nos. 18 to 20, 2.80c.; Nos. 22 to 24, 2.90c.; Nos. 25 to 28, 3c.; No. 27, 3.10c., and No. 28, 3.20c.

Old Material.—The market is in a somewhat unsettled condition, but as a rule prices are just about as they were a week ago. Some descriptions of Scrap are in greater demand than others and bring comparatively full prices, while others without being lower are not in very urgent demand. Bids and offers for material delivered in buyers' yards are about as follows:

Steel Crops.....	\$18.75 to \$19.00
No. 1 Steel Scrap.....	18.50 to 18.75
Low Phosphorus.....	22.75 to 23.25
Old Steel Axles.....	21.50 to 22.00
Old Iron Axles.....	31.00 to 32.00
Old Iron Rails.....	27.00 to 27.50
Old Car Wheels.....	23.00 to 23.50
Choice No. 1 R. R. Wrought.....	21.50 to 22.50
No. 1 Yard Scrap.....	19.50 to 20.50
Long and Short.....	18.50 to 19.00
Machinery Scrap.....	22.00 to 22.50
Wrought Iron Pipe.....	16.00 to 16.50
No. 1 Forge Fire Scrap.....	16.75 to 17.25
No. 2 Light.....	11.75 to 12.00
Wrought Turnings.....	16.00 to 16.50
Axle Turnings.....	17.00 to 17.50
Stove Plate.....	16.50 to 17.00
Cast Borings.....	14.00 to 14.50
Grate Bars.....	15.50 to 16.00

New York.

NEW YORK, January 30, 1907.

Pig Iron.—The local market has been very dull, with but little demand, either for spot Iron or for forward delivery. The market at Middlesbrough, England, has shown a sharp decline since our last and foreign Iron can be laid down at lower prices. We cannot hear, however, that any business has resulted. We quote spot Northern Iron, in small lots, \$25.50 to \$26.50 for No. 1 X, and \$24.50 to \$25 for No. 2 Foundry. For the first half we quote \$25.50 to \$26 for No. 1 Foundry, \$24 to \$25 for No. 2 Foundry and \$23.50 to \$24 for No. 2 Plain. For the second half we quote \$23.50 to \$24 for No. 2 Foundry. No. 2 Middlesbrough is \$22 to \$23, on dock, and Scotch \$24.50 to \$25, on dock.

Steel Rails.—It has been a week of light buying, and in a good many instances the inability of railroads to get the deliveries they seek—namely, in the first half of the year—is limiting business. Premiums have been offered for deliveries before July 1, and a price above \$28 could be had, it is stated, on deliveries extending even into the third quarter. One interest reports 5000 tons of miscellaneous orders for the past week. The Light Rail market is likewise governed largely by the question of deliveries, five to six months' orders being ahead. On Rails 25 lb. and heavier \$33, Pittsburgh, is minimum, and in some instances higher prices are asked.

Structural Material.—Orders aggregating 5000 tons have been closed by the American Bridge Company, with

various subsidiaries of the United States Steel Corporation. The Lorain, Ohio, additions of the National Tube Company will require 2600 to 2700 tons, and the balance is divided among new Sheet mills, new plants for the American Steel & Wire Company, Carnegie Steel Company and additions at McKeesport, Pa. The American Bridge Company has also booked a new building for the Schroth Estate at San Francisco, which will require 950 tons; an abattoir at Philadelphia, requiring 500 tons, and a Copper smelter in Nevada for the Ely Consolidated Company, 900 tons. In addition to recent large bridge contracts by the St. Paul road, it has let 1100 tons, which went to the McClintic-Marshall Construction Company, and a considerable tonnage to the Pennsylvania Steel Company. The same line has now come into the market for 3000 tons additional. In New York City one of the large jobs expected to come up this year is the terminal structure for the Hudson Companies at Sixth avenue and Thirty-first and Thirty-second streets. Plans are not definitely determined, but it is probable that 12,000 to 15,000 tons will be required. In general, reports from Structural mills note a continuation of the recent improvement in specifications and new business. We quote, as follows, on mill shipments, tidewater deliveries: Beams, Channels, Angles and Zees, 1.84 $\frac{1}{2}$ c.; Tees, 1.89 $\frac{1}{2}$ c.; Bulb Angles and Deck Beams, 1.90 $\frac{1}{2}$ c. On Beams 18 to 24 in. and Angles over 6 in. the extra is 0.10c. Sales out of stock of material cut to length are at 2 $\frac{1}{2}$ c. to 2 $\frac{3}{4}$ c.

Bars.—A fair amount of business is current, with inquiries indicating the possibility of good orders being placed covering extended delivery. Prices of Bar Iron are firmly maintained on general specifications at 1.84 $\frac{1}{2}$ c. to 1.89 $\frac{1}{2}$ c., tidewater. The Steel Bar trade is in excellent shape so far as the demand is concerned, but it is understood that deliveries are being postponed further on contracts that are now being placed. Quotations range from 1.74 $\frac{1}{2}$ c. to 1.84 $\frac{1}{2}$ c., tidewater, according to specifications, time of delivery, &c.

Plates.—While some very good inquiries are in the market, there is slight hope that they will lead to actual contracts immediately. Buyers, on the one hand, are not disposed to pay the high prices asked by Eastern mills, nor are they inclined, on the other hand, to place orders with Western mills for indefinite delivery. Current business is therefore quite limited. The range of quotations, tidewater delivery, taking the low price on long deliveries of Western mills and the rate made by Eastern mills, is as follows: Sheared Tank Plates, 1.84 $\frac{1}{2}$ c. to 2.14 $\frac{1}{2}$ c.; Flange Plates, 1.94 $\frac{1}{2}$ c. to 2.24 $\frac{1}{2}$ c.; Marine Plates, 2.24 $\frac{1}{2}$ c. to 2.44 $\frac{1}{2}$ c.; Firebox Plates, 2.75c. to 3.50c., according to specifications.

Cast Iron Pipe.—The most interesting event of the past week, and, in fact, for a long time, was the opening of bids on 38,000 net tons of Pipe at New Orleans Wednesday. Quite a number of bids were received and the lowest is stated to have been that of R. D. Wood & Co., Philadelphia, whose price was a shade under \$32 per net ton delivered. Quite a number of small contracts have been made by municipalities and gas and water companies throughout the East, but these contracts seldom ran over 1000 tons. On all such work now coming up it is understood that prices have been quite well maintained at the equivalent of about \$34.50 to \$35, tidewater, for 6-in.

Old Material.—The snow and cold weather of the past week have considerably checked shipments by railroads. Stocks, therefore, have not been accumulating. The market has been somewhat quiet, with no urgent demand, while, on the other hand, holders appear little anxious to make sales except at full prices. Some parties who have sold Scrap, which they did not have, expecting to be able to cover at lower prices, are now being pressed for deliveries, and have made offers for Heavy Melting Steel Scrap, which are more attractive than those at which sales were made last week. Heavy Cast Scrap and Stove Plate are still the leading materials as to demand, followed closely by Cast Borings. Car Wheels are strong and scarce. No. 2 Busheling Scrap is in good demand, and supplies are rather hard to pick up. From present indications it looks as if some classes of Old Material which have been more or less neglected recently will be in considerably better demand in the course of a couple of weeks. Approximate prices, f.o.b. New York, are as follows per gross ton:

Old Girder and T-Rails for Melting.....	\$16.25 to \$16.75
Heavy Melting Steel Scrap.....	16.25 to 16.75
Old Steel Rails, rerolling lengths.....	19.50 to 20.00
Relaying Rails.....	28.00 to 29.00
Old Iron Rails.....	24.00 to 25.00
Standard Hammered Iron Car Axles.....	28.50 to 29.50
Old Steel Car Axles.....	21.00 to 22.00
No. 1 Railroad Wrought.....	21.00 to 21.50
Iron Track Scrap.....	18.00 to 18.50
No. 1 Yard Wrought, long.....	18.50 to 19.00
No. 1 Yard Wrought, short.....	17.50 to 18.00
Wrought Pipe.....	14.50 to 15.00
Light Iron.....	11.00 to 11.50
Cast Borings.....	12.00 to 12.50
Wrought Turnings.....	14.50 to 15.00
Old Car Wheels.....	22.50 to 23.00
No. 1 Heavy Cast, broken up.....	19.00 to 20.00
Stove Plate.....	16.00 to 16.50
Grate Bars.....	14.00 to 14.50
Malleable Cast.....	18.00 to 19.00

Metal Market.

NEW YORK, January 30, 1907.

Pig Tin.—What appeared to be an unusually dull week ended with trade in good volume. Sales were made up to Monday of this week at 42c., or 42.05c. On that day the price dropped to 41.75c., but it was on Tuesday when the real market developed. Early in the day Tin was offered at 41.25c., with no takers, but in the afternoon sales were made at 41.35c. After which the market stiffened to 41.37½c. Still later in the day business was done at 41.45c. and 41.55c., and in all about 300 tons was sold, about half of which went to consumers. The early offerings were probably made to affect the Banca sale, but if this was the case they were unsuccessful, for that sale went to-day in Holland at the average of 42.25c. The amount sold was larger than usual, aggregating 1800 tons. To-day's market is firmer, closing in London at £189 17s. 6d. for spot and futures; in New York sales were made at 41.87½c., and it is reported that Tin is scarce. The arrivals amount to 3468 tons, and there are afloat 1669 tons.

Copper.—A fair amount of business has been transacted, but mainly in small lots for future shipment, as many of the largest consumers covered their requirements earlier in the month. Prices are steady and unchanged at 24.75c. to 25.25c. for Lake and Electrolytic, and 24.50c. to 25c. for Casting grades. These are for nearby deliveries, net cash. For strictly spot stocks, of course, premiums would have to be paid, ranging according to the urgency of consumer's requirements. The London market is slightly easier, closing to-day at £106 7s. 6d. for spot and £107 12s. 6d. for futures. The exports are of good size, amounting to 15,067 tons. There seems to be a growing disposition among consumers that unless there are lower prices for Copper as well as other commodities new construction will have to stop. This applies especially to telephone construction, new transmission lines for electric power companies, as well as extensions of existing steam and electric railroads. Not only is the price of Copper too high to warrant extensive additions unless they are absolutely imperative, but all other materials are very expensive, with which is coupled the difficulty in securing sufficient labor even at high prices. The silly story regarding hoards of hidden Copper circulated this week failed to receive any credence in the metal trade. Producers continue to be more or less hampered by a shortage of fuel. This is not so serious in the lake region, but in Canada it is curtailing production considerably, and in Butte the same conditions apply. There are also complaints regarding the slow deliveries of mining machinery.

Pig Lead.—The market is quiet, and consumers seem to have covered their pressing needs. For spot deliveries 6.30c. to 6.35c. is quoted; shipments can be had at 6.25c. to 6.27½c. In St. Louis prices are steady at 6.10c. to 6.15c. The London market is slightly easier at £19 12s. 6d. The American Smelting & Refining Company continues to quote 6c., covering old contracts.

Spelter.—Shipments of Spelter can be had at 6.80c. to 6.90c. Spot commands a premium ranging from 7c. upward. In St. Louis the market is firm at 6.75c. The London market is unchanged at £26 15s.

Antimony.—There has been some hardening of prices, but it is still possible to secure metal below importer's quotations. The general range of prices would be 25.25c. to 25.75c. for Cookson's, 24.50c. to 25c. for Hallett's, while outside brands can be had at 23.75c. to 24.75c.

Ferroalloys.—Consumers of Ferrosilicon are compelled to purchase small lots to satisfy their immediate requirements, and for these are paying high prices of \$110 to \$112 for 50 per cent. The old price of \$150 continues to be quoted for 75 per cent. The market for Ferromanganese is unsettled, it being reported that the supply is more plentiful than generally believed. A sale of a large lot was reported, made in Baltimore, around \$70. There is no doubt that the improved conditions in Russia will bring about a larger supply.

Tin Plate.—There has been some shading in the price of imported Plates, and to-day the London market declined 3d., to 14s. 7½d. Domestic Plates are firm and unchanged at \$3.90, f.o.b. Pittsburgh, and \$4.09, f.o.b. New York, subject to the usual trade discount for carloads.

Old Metals.—Dealers are not disposed to make concessions in their selling prices, although there is a feeling that prices may work lower. Scrap metal is scarce, as the weather has interfered with collecting. Dealers' selling prices are as follows:

	Cents.
Copper, Heavy Cut and Crucible.....	23.00 to 23.50
Copper, Heavy and Wire	22.25 to 22.75
Copper, Light and Bottoms.....	20.00 to 20.50
Brass, Heavy	16.25 to 16.50
Brass, Light	13.50 to 13.75
Heavy Machine Composition	20.50 to 21.00
Clean Brass Turnings	14.75 to 15.25
Composition Turnings	17.50 to 18.00
Lead, Heavy	6.00
Tea Lead	5.70
Zinc Scrap	5.00

Iron and Industrial Stocks.

NEW YORK, January 30, 1907.

The stock market underwent a complete change of form during the week. Prices had been fairly strong on Thursday and Friday, but on Saturday liquidation set in, which became quite severe on Monday and Tuesday. The range of prices therefore shows quite a sharp recession. The following are highest and lowest prices from Thursday to Tuesday, inclusive, on active industrials: United States Steel common 43½ to 47½, preferred 104½ to 106½; Car & Foundry common 41½ to 44½; Locomotive common 71¼ to 74¼; Steel Foundries preferred 44 to 45½; Colorado Fuel 47¼ to 53¾; Pressed Steel common 49½ to 54¼; Railway Spring common 52½ to 54¼; Republic common 36 to 38¼, preferred 97 to 99; Sloss-Sheffield common 71 to 74; Cast Iron Pipe common 46½ to 47½. The magnificent earnings reported by the United States Steel Corporation caused a short lived rally this morning, after which prices again receded. Can was under special pressure, the preferred selling down to 48. Last transactions up to 1.30 p.m. to-day are reported at the following prices: United States Steel common 43½, preferred 104½; Car & Foundry common 42½, preferred 101½; Locomotive common 71¼, preferred 111½; Steel Foundries common 10, preferred 44; Colorado Fuel 47½; Pressed Steel common 49½, preferred 98¼; Railway Spring common 52½; Republic common 36¼, preferred 97¼; Sloss-Sheffield common 70¼; Tennessee Coal 159½; Cast Iron Pipe common 46¼; Can common 4½, preferred 49½.

Dividends.—The United States Steel Corporation has declared the regular quarterly dividend of 1¼ per cent. on the preferred stock, payable February 28, and one-half of 1 per cent. on the common stock, payable March 30.

The Pressed Steel Car Company has declared the regular quarterly dividend of 1¼ per cent. on the preferred stock, payable February 27.

The Kewanee Unions.

A specialty of the Western Tube Company, Kewanee, Ill., is a male and female union the two principal parts of which are of different metals, iron and brass, so that in making up a joint no gaskets are required, and the brass to iron thread connections cannot rust together. The particular advantage of the male and female form is that it saves the use of a nipple, such as is usually necessary in making connections when the ordinary union is used. The saving in the number of the parts required and in the labor of making up is claimed to offset the slightly higher cost of the improved form of union. A particular value of the union lies in its use in close work, since it eliminates close nipples, which are so difficult to make tight.

There are only three parts to the union: the iron male end, the iron ring nut and the brass female end. Where the two principal parts meet a ball joint is provided, making it possible to secure a tight joint without the use of gaskets. Before being shipped the unions are tested under water with compressed air. This test is much more severe than one with either water or steam pressure. The brass part is made with a hexagonal end, so that it may be disconnected and reconnected with an ordinary monkey wrench.

Besides the male and female pattern Kewanee union several other patterns are made, including the regular round end female pattern, and one with a hexagon brass end. This may also be connected with the aid of an ordinary wrench, instead of a Stillson, and is popular in many lines of work.

The steamer Hugh Kennedy, built for the Buffalo & Susquehanna Steamship Company, and its third lake freighter, was launched January 26 at the Lorain yard of the American Shipbuilding Company. The vessel is named after the general manager of the Buffalo & Susquehanna Iron Company, with which the Steamship Company is closely connected. It is 552 ft. long, 56 ft. beam and 31 ft. deep.

The first international exposition of safety devices was opened at the American Museum of Natural History, New York, on January 29. It is held under the direction of the American Institute of Social Science, which hopes to make the exhibition permanent.

Customs Decisions.

Machinery Imported for Repairs.

A suit brought by Camroho, Roldan & Van Sickel, New York, to test the customs regulations relating to the importation of machinery for repair purposes has been decided adversely to the claims of the importers by the Board of United States General Appraisers. It appears that the firm entered certain engineer's instruments under a so-called repair bond. The regulations provide that such articles may be entered under bond for a period of six months. In the case at bar, however, the instruments were not exported and the collector of customs exacted duty. The board upholds the legality of the action of the collector in levying duty.

Decisions Cannot Be Challenged Twice.

In denying a claim filed by La Manna, Azema & Farnan, New York, the Board of Appraisers lays down the principle that an importer may not a second time successfully challenge the same decision. If his protest has been overruled in the first instance, directly or indirectly, the remedy is by application to the United States courts to review the finding of the lower tribunal.

The board has overruled claims submitted by the following: Thomas Meadows & Co., ground carbon; Wells, Fargo & Co., nickel wire; Demorest Mfg. Company, machines; Guthman, Solomons & Co., hand sewing needles; Reiling, David & Schoen, machinery; Wilfred Schade & Co., machinery. Protests filed by the Valley Wind Engine & Iron Company and others and John Dunn, Jr., regarding the customs classification of molder's patterns and gramophone points, were sustained.

The Zinc Ore Controversy.

The Board of General Appraisers is expected to promulgate a decision within a few days in the customs controversy regarding the classification to be accorded zinc ore. It is maintained by the Government and mine owners on the one hand that the ore should be assessed at the rate of 20 per cent. ad valorem, under the provision in the law for metallic mineral substances, while the importers and smelters contend for free entry under the tariff provisions for calamine. An alternate claim is that the ore should be taxed at specific rates on the basis of the actual amount of lead contained in the ore. The official record of testimony and exhibits is one of the heaviest in the history of the board. The mine owners interested in the case number more than 400. It is stated that, whichever way the lower tribunal decides the case, an appeal will be prosecuted to the Federal courts.

Commissions Included in Dutiable Value.

The troublesome question of commissions figures in a decision handed down January 18 by Judge Hazel in the United States Circuit Court. The finding of the court is against the protestants, N. Erlanger, Blumgart & Co., New York. It appears that upon entry of the merchandise in controversy certain amounts equaling items described in the invoices as commissions were deducted by the importers from the price stated in the invoices, but were added by the Appraiser of the Port to make market value, his action in that respect being affirmed on appeal by a general appraiser and a board of three general appraisers. In passing upon the importer's protests against the legality of the appraisements, the board excluded evidence offered to show that the commissions were, in fact, non-dutiable, and affirmed the assessment by the collector. It was maintained by the importers, before the Circuit Court that the board erred in excluding such evidence and in failing to hold that the commissions were improperly included in the value of the goods. While believing that the evidence should have been admitted, Judge Hazel is unable to sustain the importers for the reason that their evidence submitted to the court is not persuasive.

Wire Rods for Screws.

It has been decided by Judge Hazel in the United States Circuit Court that wire rods used in the manufacture of screws are not subject to an additional duty of $\frac{1}{4}$ cent per pound under paragraph 141 of the tariff, which provides for the payment of the extra duty upon iron or steel bars or rods which are cold rolled or cold drawn

or polished in any manner in addition to the usual process of hot rolling specifically described in paragraph 136. Under the ruling of the court, which reverses a decision of the Board of United States General Appraisers, the importers to the suit, George Nash & Co., will pay only 4-10 cent per pound on the merchandise. The question before the court was whether the cold rolling of the rods to make them smooth and facilitate their use in the screw making machine is the cold drawing specified in paragraph 141. On this point Judge Hazel says in part: "Brightening of the surface of the screw rod is subordinate and incidental to the smoothening or cold rolling process which is essential to the production of the screw rod. In *Arthur vs. Leigh* the rule is laid down that when Congress has designated an article by a specific name and by such name imposes a duty upon it, the general terms in a subsequent act or in a later part of the same act, although sufficiently broad to comprehend such article, are not applicable. For the foregoing reasons the merchandise, in my judgment, was dutiable under paragraph 136 at 4-10 cent per pound, and not subject to the imposition of any additional duty."

Pennsylvania's Railroads Break Tonnage Records.

HARRISBURG, PA., January 28, 1907.—The report of the Pennsylvania State Bureau of Railways, recently submitted to the Legislature, shows all previous records broken by the railroads of the State for freight tonnage, passengers and receipts in the fiscal year ending June 30, 1906.

The total freight movement was 710,829,768 net tons, a gain of over 75 per cent. over 1905, yielding a revenue of \$525,579,219. This tonnage was chiefly divided as follows: From mines, coal and ore, 439,000,000 tons, in round numbers; manufactures, including iron and steel, 132,000,000 tons; agricultural products, 40,000,000 tons; animal products, 12,000,000 tons; forests, 34,000,000 tons. The coal, ore and manufactured products alone furnished over three-fourths of the freight business of the railroads, and no previous records are anywhere near these gigantic figures. The Pennsylvania Railroad and its affiliated lines carried almost 216,000,000 tons, although the Philadelphia & Reading made the best showing of the big systems on earnings per mile, its figure being \$32,649. The Monongahela Connecting Railroad, a small line near Pittsburgh, earned \$123,879 per mile for its trackage.

Passenger traffic amounted to 297,271,092, exceeding 1905 by over 16,000,000, and resulting in an income of \$139,647,284.

The financial statements of the railroads are interesting by reason of their enormous figures and the heavy cost of equipment and maintenance of way. The total earnings were \$790,984,377 and expenditures \$679,670,786. Maintenance of way and structure, such as bridges, &c., cost practically \$85,000,000; equipment, \$112,000,000; conducting transportation or operation, \$257,000,000; general expenses, \$15,000,000, while fixed charges and taxes amounted to \$207,000,000. All these figures rank very high, most of them being new records. The dividends were \$4,000,000 in excess of dividends paid in 1905 and four times the total of those in 1901. A. B. H.

Rifling Steel Pipe.—In a paper read before the Engineers' Society of Western Pennsylvania, F. N. Speller, of the National Tube Company, referred to the fact that in the California field a quantity of steel pipe has been rifled, the object being to cause the viscous oil intermixed with a small percentage of water to whirl as it moves rapidly through the pipe. Thus, when a sufficient velocity is attained, a layer of water flows between the oil and the pipe, reducing the friction in the line. It has been found quite practicable to roll spiral corrugations $\frac{1}{8}$ -in. deep in the surface of the pipe by means of six wheels set equidistant around the circumference and slightly inclined to the axis of the pipe, so as to make a complete revolution on the surface of the pipe every 10 ft. The material appears to stand this treatment cold without difficulty.

The Machinery Trade.

NEW YORK, January 30, 1907.

Orders and inquiries received in the trade the past week cover a large amount of equipment, a good portion being from the railroads, which are buying quite freely, though in small lots. A fair sized list of tools has been sent out by the Baltimore & Ohio Railroad, but few in this district have received it, while the Oregon Short Line has placed an order for two large air compressors. From reliable reports it is evident that the railroads are getting ready to place a good volume of business. The demand from industrial plants continues heavy and firm, the chief difficulty being the inability to obtain tools within a reasonable time. Within the past few days additional machine tool builders have withdrawn quotations preparatory to advancing prices, and the advance is apparently being extended so as to cover the entire line of tools. These latest changes cover principally lathes, drills and millers.

That there is an unusual demand for steel castings is no better illustrated than by the experience of an Eastern manager for a prominent manufacturing company which makes a specialty of castings of all kinds. This company has other lines as well, but it has never neglected its steel casting business, and has enlarged of late as rapidly as conditions would permit. The Eastern representative, finding his time greatly taken up with the other lines, recommended that the company add another man to the branch office in New York who could devote his entire attention to the steel casting business. He showed that he was unable to visit customers or give any time to looking for new business in that line, and he declared that the business in that respect was not expanding as rapidly as conditions warranted. He was somewhat surprised to receive a reply from the company to the effect that the home office appreciated the conditions and agreed with him that he would be overworked if he paid any great attention to the castings end of the business. The New York man's principals declared, however, that it would be inadvisable to seek for orders in the line under discussion, as if any new business came in at present they would be unable to take care of it. The company stated that it would be pleased if it was able to take care of its present customers, and urged upon him the necessity of holding off orders as far as possible without losing the trade rather than to attempt to push business in that line. This is in keeping with the experience of other salesmen in various lines, and it is known that there are many manufacturers who are attempting to hold their trade and gain time for deliveries rather than seek for new business.

Lackawanna Railroad's Improvements.

It is likely that the year will bring forward a considerable demand for machinery equipment from the Delaware, Lackawanna & Western Railroad, which is making plans for improving its suburban service by installing electricity as a motive power. The company is now abolishing its grade crossings in New Jersey, but is having considerable trouble in that respect on the division extending through the Oranges, and it will perhaps take the remainder of the present year to get things in shape there. It is understood, however, that notwithstanding the uncertainty as to the time when the improvements are to be completed, the company is looking into the electrification scheme and a general plan along that line has been adopted. The company proposes to electrify its line from Hoboken to Morristown on the Montclair branch, and a system similar to that recently put in operation by the New York Central Railroad will be adopted. This will be a third rail line and of course its installation will require the purchase of a large amount of power apparatus as well as repair equipment especially adapted for making repairs to electrical equipment. The company's plans for building a large system of shops at Scranton, Pa., are also under way, and it is stated that part of the proposed improvements there will be completed during the present year. Engineers are now working on the plans, and it is understood that a list of needed equipment is being prepared. Just how much of the plant will be completed this year is not known as yet, but it is understood that fully half of the improvements arranged for in the preliminary plans will be carried out. The general plan for building the Scranton shops provide for the razing of the existing locomotive and repair shops, and a building, approximately 364 x 758 ft., capable of taking care of about 40 locomotives at one time, will be erected. There will also be a blacksmith shop about 128 x 300 ft., and a paint shop, pattern shop and pattern storage house, 50 x 300 ft. All of the machinery will be electrically driven, and the size of the power house to be constructed has not been announced as yet. It is understood that the plans for the new shops include the installation of considerable conveying apparatus, such as coal handling machinery and the like, as well as some large sized cranes. There is some machinery equip-

ment now at Scranton which will be used in the new shops, but this will not be enough for the demands for even this year's construction work.

Pennsylvania Railroad's Machinery Requirements.

The five wrecking cranes included in the 1907 equipment programme of the Pennsylvania Railroad, the allotment for the present year, is the most important inquiry which has been issued by the purchasing department this year. The cranes are of the usual type, known as a 70-ton crane, although actually of 100 tons capacity; 70 tons is the maximum capacity when the jib is drawn out at full length at a 16-ft. radius. The capacity of the crane is as follows: Maximum radius of main block to be about 25 ft. and the minimum radius to be about 16 ft. This radius is to be variable between these limits by the radius varying appliances. When the main hoisting hook is at a radius of about 20 ft. the bottom of the jib should be at this point about 18 ft. 11 in. high from the truck, and the blocks hang 7 ft. clear of ends of the car. The varying capacities for all motions under various conditions should be as follows: With all outriggers in position, 100 tons at 17-ft. radius, 80 tons at 20-ft. radius; with end outriggers only, blocked close to corners of cars, 48 tons at 16-ft. radius; without outriggers, at right angles, 24 tons at 16-ft. radius, 18 tons at 20-ft. radius; over end of car, 56 tons at 16-ft. radius. In addition to the foregoing an invitation to bid has been extended to the crane manufacturers upon one 50-ton and three 20-ton traveling cranes of general appearance as shown on blue print and described in specifications which accompany the inquiry. Separate quotations are requested for the 50-ton and also for one, two and three 20-ton cranes. Detail specifications and a general arrangement plan showing the design suggested and dimensions of the principal parts are to accompany each proposition. Aside from the crane inquiries, which are the most important of the recent invitations to bid, the following list has also been sent out: One surfacing grinding machine, capable of grinding work 5 ft. long, 16 in. wide and 12 in. high, machine to be belt driven; one open throat bar shear, with one set of shear blades for flat bars up to 2 x 10 in., one set for round iron up to 3 1/4 in., machine to be motor driven, alternating current motor, 220 volts, 60-cycle, two-phase; one 28-in. and one 30-in. portable valve seat rotary planing machines.

The announcement of the sale of \$50,000,000 short time notes by the New York Central Railroad indicates that the road is going ahead with the large improvements planned some time ago. Some of these improvements have progressed to the point of purchase of machinery, and the trade can undoubtedly look for good sized orders from this company within a short time. The list of mechanical requirements for the Grand Central Station has been prepared, but has not yet been sent out, while announcement of the placing of the contract for the electrical equipment for the Detroit tunnel can be looked for almost any day.

Considerable machinery will be required by the Pittsburgh & Butler Street Railway Company, Pittsburgh, Pa., for equipping its proposed new car repair shops near Butler, Pa., contract for the erection of which has just been placed. The company has not yet made up a list of the machines it expects to purchase for this plant. The equipment is in charge of the chief engineer, Hudson F. Layton.

The Intercolonial Railroad has placed contract for the erection of its locomotive shops at Moncton, N. B. The contract was secured by the same company which is erecting the other buildings at that place, where the railroad will eventually have extensive car shops.

The Reading Railroad has let contract for the erection of a large car shop at Rutherford, Pa. The building will be 123 x 613 ft., and will be equipped with machinery capable of taking care of repairs on 60 freight cars at one time.

The Howe Engineering Company, 150 Nassau street, New York, is buying in the open market machinery to fill its contract to furnish the mechanical equipment for the Stuyvesant Manual Training High School on Fifteenth and Sixteenth streets near Lexington avenue, New York, for which bids were received on November 26 last, when the Howe Company's bid, amounting to \$69,800, was accepted. It is understood that some of the orders for machine tools have been placed, but there are still inquiries out in the trade in order to complete the complement of machinery needed. While most of the machines were specified as to the manufacturer in the original contract, it was given out that alternates equal in design and construction would be accepted, and this offers a chance to the trade for some competitive bidding on the Howe Company's proposition. The list includes various forms of saws, woodworking machinery, motor driven lathes of various sizes, drilling machines, milling and grinding machines, some metal working equipment, presses, a punch and shear, No. 4 power hammer with 100-lb. ram, a quantity of foundry equipment, 39 motors from 1/2 to 10 hp., five motor generator sets, one 1000-lb. hoist and other equipment. It was stipulated that this machinery was to be delivered within 90 days of the placing of the contract, but it is said in the trade that in a number of cases it will be hardly possible to get deliveries on such equipment as is needed within that time, and there is no doubt under those circumstances the time will be extended.

The McCrum-Howell Company is in the market for a six-spindle drill, to drill 2-in. holes, 6 $\frac{3}{4}$ in. from center to center, and also a reaming machine for installation in its plant at Norwich, Conn. Communications should be sent to the general superintendent, John A. Holfelder, at the New York office, 46 East Twentieth street.

It is stated that the south Atlantic Car & Mfg. Company, Waycross, Ga., will rebuild its large shops near Savannah, which were recently destroyed by fire. It is understood that the new buildings will have considerably increased capacity over that of the burned plant, and it is likely that the company will have to buy considerable in the way of new machinery.

The Phoenix Lock Works, 22-24 Commercial street, Newark, N. J., is building at the corner of Third avenue and North Fourth street, Newark, a brick factory, 100 x 100 ft. The plant will include a foundry for casting in brass and bronze, buffing and polishing room and a general machine shop. The company manufactures trunk locks and builders' hardware, and will probably be in the market for some machinery equipment, which will include coal and ash handling machinery and a blower system. Gas engines will be used, but the amount of horsepower has not been decided as yet. The company will also require boilers for heating the building and furnishing hot water for its plating room. The company is controlled by Edwin E. Dent and James C. Jones, who are looking after the details of equipping the plant.

New Subway Bids.

The fact that the Rapid Transit Commission has issued an invitation to contractors to bid on the construction of the proposed Lexington Avenue Subway is an assurance that the trade will soon hear of machinery requirements for that work. The contractor or contractors who get the work will require a large amount of equipment, and after the construction work there will be much in the power line to be bought. A new form of contract has been adopted by the Commission which provides that all of the contract work will be done under cover, and the stations are to be built on private property. The contracts will be let in separate sections, and there will be seven separate contracts, each for a large section of the proposed Subway. Parts of the proposed road are to be double decked, and the lower tracks in that case are to be used for express trains. As it is provided that the contractors shall begin work within 60 days after the execution of the contract and that the work must be completed within four years, it is apparent that whatever machinery needs that arise from the construction operations will be brought before the trade very shortly. No time as yet has been set for receiving the bids for the work.

The Brooklyn Rapid Transit Company is to double the size and capacity of its Kent avenue power station, and when the improvements are completed this plant will be capable of generating 150,000 hp. Contracts for the greater part of the equipment, including 15,000-hp. turbines, boilers, &c., have been placed, as has the contract for the additional structural work. The company is expending about \$5,000,000 at that plant, and in addition has improvements under way that will entail an expenditure of between \$6,000,000 and \$8,000,000.

Gus Sandblohm, 207 Borden avenue, Long Island City, who some time ago had inquiries in the market for power house equipment, has decided to purchase 250 hp. of engines in two units direct connected to 200-kw. generators, with boilers to correspond. The structure for which the equipment is intended will be completed shortly.

W. S. Barstow & Co., 56 Pine street, New York, are the consulting engineers for the Bergen Point Chemical Works, which is having a power plant erected in connection with its manufactory at Constable Hook, Bayonne, N. J. The plant will be from 300 to 400 kw. in size, and the orders will probably be closed by the company.

The Long Island City Factory Company, which is closely connected with the T. B. Ackerson Company, 140 Nassau street, New York, is making inquiries in the market for equipment for a central power plant it contemplates establishing in connection with two factories the company is building in Long Island City. It has not been decided yet when the plant will be installed, but if the company decides to equip the two buildings with power in that manner a good sized plant will be used. The structures are respectively 40 x 200 ft. and 50 x 200 ft., and four stories in height. The buildings are being constructed for either rent or sale, and they will probably be let out by floors for various manufacturing purposes.

The Hyatt Roller Bearing Company, Harrison, N. J., gave its fifth annual reception at the Waldorf-Astoria on Wednesday evening, January 16. The affair was attended by many representatives of the automobile trade who were in New York in connection with the automobile show. Peter Steensrup had charge of the arrangements for the company and covers were laid for 300 people. A vaudeville show was given and there were many interesting features, among which was a regulation oil pump that spouted something many considered worth drinking.

Business Changes.

The Warner & Swasey Company, Cleveland, Ohio, has opened an office in the Singer Building, 149 Broadway, New York, under the management of H. L. Kinsley. Associated with Mr. Kinsley as salesman is A. C. Cook.

Louis Anciaux, formerly of the firm of Louis Anciaux y Cia, has opened an office in Mexico City, Mexico, where he will carry on an agency and commission business which will comprise the sale of materials and machinery connected with the building and construction line, structural steel and equipment for machine shops, foundries, mines and railroads.

Catalogues Wanted.—The Mott Wheel Works, Utica, N. Y., has incorporated with a capital stock of \$25,000, and will take over the wire wheel department of the Weston-Mott Company of that city, whose plant will be occupied by the new company. The extensive automobile department of the Weston-Mott Company will be moved to its new factory at Flint, Mich. The directors are O. W. Mott, A. E. Swartwout and F. H. Doolittle. The company would be pleased to receive catalogues of machine tools.

Chicago Machinery Market.

CHICAGO, ILL., January 29, 1907.

Although machine tools were among the last in the list of machinery lines to feel the stimulus of a growing prosperity, yet once started the movement has been one of continued advancement, both as regards price conditions and volume of business. Notwithstanding the upward trend of prices, which already includes several distinct advances, tool makers claim that considering the class of workmanship and finish of their products it has not yet reached the price level attained in other lines of machinery involving a less degree of accuracy, intricacy of design and mechanical perfection. They therefore regard prices higher than those now ruling as a logical result of these conditions. Besides an advance of 5 per cent. on engine lathes recently reported, there is an upward tendency extending to the general line of lathes, planers and shapers, and there are indications pointing to the further advance on gear cutting tools. Deliveries on regular stock tools can now be had with reasonable promptness, but dates for shipment for special tools continue to run far into the future. Inquiries for boiler tools, heavy machinery and power producing equipment are unusually plentiful, and have noticeably increased since the beginning of the year. The proportion of orders resulting therefrom, however, is relatively small, due no doubt to the fact that the question of increase of plant capacities and proposed new enterprises is now under consideration by a large number of executive boards and business managements, which at this season of the year quite commonly have such matters under review. That these inquiries will later be productive of much new business can hardly be doubted, and are significant of both present and future activity in manufacturing plants. Boiler shops are full of work, and, aside from ordinary stock boilers, it is difficult to get deliveries on work made up from specifications inside of 60 to 90 days.

Baltimore and Ohio Railroad's Machinery Requirements.

The Baltimore & Ohio Railroad Company's January list of machinery and tool requirements, on which bids are asked, to be received not later than February 4, comprise the following: One 16-in., one 24-in. and one 26-in. stroke bulldozer, all belt driven, with solid cut gears; one 54-in. stroke, double frame, 6000-lb. steam hammer; one 16-in. stroke, single frame, 200-lb. steam hammer for tool dressing; one 500-lb. treadle steam hammer; one 33-in. stroke, single frame, 2000-lb. steam hammer; two 28-in. stroke, single frame, 1100-lb. steam hammers; three 33-in. stroke, single frame, 3500-lb. steam hammers; one 45-in. stroke, single frame, 3500-lb. steam hammer; one universal milling machine, 23-in. table feed, 7 $\frac{1}{2}$ -in. cross feed, vertical speed 17 $\frac{1}{2}$ in., to take 15 in. in length, with a swing of 10 in. in diameter; one 48-in. band saw, belt driven; one No. 3 circular saw, belt driven; one pipe bending machine, with capacity up to 3 in.; one polishing and buffing machine, with pedestal stand and countershaft for electrical work; two winding drag wheels for electrical work; one 1 $\frac{1}{2}$ -in. hollow chisel car mortising machine, with two auxiliary boring attachments and lifting table, complete with augers, belt driven.

The John F. Byers Machine Company, Ravenna, Ohio, has increased its capital stock from \$100,000 to \$150,000, for the purpose of enlarging its present equipment and extending the business. A new foundry building, pattern

storage building and erecting shop will be built in the near future, although plans for these improvements are not yet completed. Contracts for buildings and machinery equipment will be placed within the next 30 or 60 days.

The Columbus Brewing Company, Chicago, is arranging for extensions to its present plant and equipment, which will require additional machinery. Within the next 30 or 60 days the company will be in the market for one 200-hp. water tube boiler and one 100-hp. Corliss engine.

The Curtis-Leger Fixture Company, Chicago, manufacturer of metal store display fixtures, has removed its offices and showrooms from 126 Franklin street to 245 East Jackson boulevard. This company has now in course of construction a new reinforced concrete factory building at 350 West Jackson street, which will be ready for occupancy in about 60 days. Most of the tools required for the plant's equipment have been bought, but the company is yet in the market for some minor supplies, in the way of pulleys, hangers and shafting.

The Waterloo, Cedar Falls & Northern Railroad, of which L. S. Case, St. Paul, Minn., is president, has in contemplation the erection of a new power house involving an expenditure of \$100,000. Work upon this improvement is expected to begin at an early date, as the capacity of the present plant is inadequate to handle the volume of business.

The Vulcan Iron Works, Chicago, is building a four-story addition, 90 x 124 ft., to its Irving avenue plant for the accommodation of its pattern shop and foundry service. Its present city office, now at 59 Milwaukee avenue, will be removed to the above location about May 1.

The Indiana Road Machine Company, 22-24 Canal street, Chicago, will remove from its present location about May 1 to 20 Canal street.

E. L. Essley, formerly secretary and treasurer of McDowell, Stocker & Co., dealers in machine tools, 59 South Canal street, Chicago, has severed his connection with and retired from this firm.

Philadelphia Machinery Market.

PHILADELPHIA, PA., January 29, 1907.

While the amount of actual business closed the past week has not been large, the general condition of the market has taken on a stronger tone. The demand during the month has been about an average one for this particular time of the year, and the developments in the past week, while not in shape of immediate orders, promise some very satisfactory business in the near future. Inquiries are plentiful and cover all classes of tools and machinery in varying quantities. The greater part of the business offered has been for individual tools, mostly in the medium sizes, but some better business covering larger equipments has also come out. The Baltimore & Ohio Railroad Company has specifications out for a good lot of tools for 1907 delivery, many of which are of the heavier types. The expenditure for this equipment will, it is said, aggregate \$50,000 to \$60,000, and the tools are to be distributed in the different shops of the company. There is also another inquiry for quite a fair lot of tools for a new plant now being erected in this territory, which includes in addition to regular equipment quite a few extra heavy tools.

Buyers as a rule have not yet completed their annual balancing of accounts, and until these are concluded there is but little expectation of active buying. Prices continue strong; advances have now covered about the complete line and have had but little effect on buying. Deliveries as heretofore continue the important factor in present sales, and the manufacturer or dealer who can make the best delivery stands the best chance of getting the business, even though the price be materially higher. Manufacturers continue very busy. Current orders received from time to time have been sufficient to preclude any material gains on delivery, and in many cases there is unwillingness, which if not shown, is unquestionably felt, on the part of some manufacturers toward taking on business in any quantity for extended future delivery. With shipping dates as distant as six and nine months and in some cases a year off, the uncertainty of costs, raw materials and other matters is so great that builders of certain lines of tools practically refuse to make quotations subject to delivery dates.

There is little change in the conditions governing the export trade in this territory. Inquiries from abroad for machinery and tools are not very extensive, and are confined largely to special tools and equipment. The demand for machinery specialties keeps up quite satisfactorily and a good quantity of orders is coming in, although they are probably not as large individually as some time ago.

The demand for boilers and engines is not very active, and manufacturers and dealers find but little business floating about for early closing. Such propositions as have been before the trade do not seem to develop into orders promptly,

and there seems to be plenty of room for improvement in this branch of the trade.

Second-hand machine tools are in good demand and dealers are making every effort to keep stocks up, but have difficulty in doing so, because they find themselves frequently outbid by a direct purchaser. Could good tools of fairly recent build be had there would be little trouble experienced in making sales. Prices, owing to the scarcity of many lines of tools, are stronger, and have in some cases advanced materially.

Castings, both gray iron and steel, are in active demand, and foundries are frequently unable to take care of the business offered. The scarcity, as well as the uncertainty in the delivery of raw materials, has in many cases caused added delays, and, as has frequently been the case, foundries have, owing to the nondelivery of pig iron, been compelled to close down temporarily, not only once, but several times within a short period. Gray iron foundries have been affected to a greater extent by this than have the steel casting plants, although they also have experienced some difficulty in getting raw materials of some kinds as promptly as desired.

The Eagle Wheel Company, manufacturer of wire wheels, &c., is making an addition to its plant at 942-944 Russell street. The building to be erected will measure 25 x 40 ft., and will be used as a machine and blacksmith shop.

The Bureau of Filtration, City of Philadelphia, has awarded to the Bennis Construction Company the contract to furnish steel and iron elbows, connections, &c., also to perform the work of laying a quantity of steel and cast iron pipe in connection with the Torresdale Filtration plant, previously noted in these columns. The contract price was close to \$40,000.

It is understood that the Tinicum & Sharon Hill Railway Company is preparing plans for the construction of a trolley road from Sharon Hill to a connecting road in this city, the distance being about 4 miles. Those interested in the project are said to be Walter A. Rigg, Reading, Pa.; J. M. Miller, H. H. Reigel, W. A. Rosen, and W. S. Bell, of this city.

The Hub Machine & Tool Company reports business in a very satisfactory condition. The demand for general machinery is good and that for its line of Acme saw tables, particularly those of the larger size, is better than ever. This saw table, which is now made with a 22 x 24 in. top, is equipped with direct motor drive, and is built for heavier duty throughout.

I. H. Johnson, Jr. & Co., note a good demand for their full line of lathes. Order books are well filled, having sufficient business to keep the plant fully occupied for a long time. There has been a particularly good demand for lathes with the new Johnson geared heads equipped with friction clutches, which are being made in 16, 18, 20 and 24 in. sizes, either belt or electrically driven, a number of which are on order. Most of the lathes shipped the past month have been of medium and smaller sizes, 30-in. swing and under, which have been delivered to customers from New England to the Middle West. A number of large, heavy lathes ranging up to 60-in. swing are in course of construction, to be delivered during the coming month.

The American Pulley Company notes that while orders received recently have been numerous, they have not been for as large quantities as was the case several months ago. Buyers are taking only what they need, but it is expected that after the usual January stock takings are concluded orders for larger quantities will come along as heretofore. The foreign demand for pulleys has been good and shows an increase. Shipments have been made recently to Australia, New Zealand and various African countries, as well as to many points in Continental Europe. Domestic deliveries cover the usual range from New England to the Pacific Coast, an increase, however, being noted in the local and nearby territory.

The E. H. Mumford Company, manufacturer of foundry molding machines, reports business in a very good condition. Orders have been received for machines of all classes, particularly for those of the split pattern, power ramming and jolt ramming types. Rathbone multiple molding machines and Pridmore rock-over machines have also been in good demand, and the business of January to date is greater by far than any previous month in the company's history. Recent shipments have covered a large variety of machines for gray iron, steel, malleable iron and brass castings for foundries in various parts of the country, while a number of machines were also exported to Canada.

The Link Belt Company has been continuously busy in every department. The amount of business offered has been large and the estimating department has been very busy quoting on all classes of work. Orders for a number of retail coal pockets have been taken, varying from 1000 to 5000 tons in capacity. Coal and ash handling plants are being installed for the Standard Ice Company, a local concern, and for the Hammermill Paper Company, Erie, Pa. A large amount of phosphate handling machinery is being furnished Southern concerns, while sugar handling machinery has been exported to Cuba. This company has just completed the installation of a large plant having a capacity

of handling 500 tons of coal per hour, for the new River & Pocohontas Coal & Coke Company, Gentry, W. Va. This includes car hauling machinery, lowering and transportation devices, separators, screens, and hoisting apparatus.

Cincinnati Industrial Notes.

CINCINNATI, OHIO, January 29, 1907.

There have been no new developments during the week in machinery circles, with perhaps trade a little more quiet so far as additional orders were concerned. As noted in last week's issue, plants along the river front have been in serious straits for the past week or ten days, and have been partially or altogether shut down. The outlook to-day, however, is much brighter, and the river is slowly returning to its normal channel. The frequency with which these flood seasons appear will no doubt tend toward the moving of a number of plants that are now located within this zone to points far removed from the annual devastation by water.

P. E. Montanus in talking of the outlook for the future, said: "My personal views as to the business for the immediate future is that I believe there will be a greater and heavier demand for machine tools this year than last. The foreign trade is still very heavy, and is making more demands upon American tool builders than they care to deliver. Prices are still on the upward tendency, and if the unusual scarcity of skilled labor continues to prevail I am satisfied that by July 1 there will be still a further advance in prices."

The annual meeting of the Steel Foundry Company was held during the week, and the old directors elected with the exception of W. H. Stewart, who was succeeded by W. B. Melish. Mr. Stewart, who was secretary, is succeeded by Capt. J. F. Ellison.

The annual meeting of the Cincinnati Industrial Bureau was held at the Business Men's Club on January 21. The attendance was large and embraced many of the city's representative business men and machine tool builders. Hon. M. E. Ingalls, one of the speakers, announced that it was an assured fact that Cincinnati is to get a new union station, which it is to be hoped will be located above high water mark. Other speakers were William H. Manss of Chicago and Pro. John Uri Lloyd, who spoke on general industrial conditions. President William Lodge in his annual report advocated local capital investing in local industries; a company to finance local industries; a land syndicate to build model homes for workmen and the bringing of desirable foreign element to the city to increase the number of workmen. The report of Secretary Will L. Finch was replete with interesting facts and figures, and it might not perhaps be amiss to give a few excerpts from it. Mr. Finch said: "The Industrial Bureau closed its sixth year of labors for the development of Cincinnati with a membership greater in number, more diversified in interest and more closely organized than at any previous time in its history. For the first time the Bureau's available funds have touched the \$10,000 mark, enabling the retiring directors to turn over to their successors a balance that may warrant a more extensive advertising campaign the ensuing year. In this connection it is interesting to note that there have been articles of incorporation for Cincinnati firms filed at Columbus, Ohio, during the year numbering approximately 215, with an aggregate capital of \$15,000,000. Adding to this \$8,000,000, the amount of increase of capital applied for by existing corporations, makes a total of new capital incorporated during the year of \$23,000,000. These increases of capitalization represent but a small part of the capital that has been invested by existing industries in additions to and extensions of plant and capacity. It has been conservatively estimated that the total new capital invested in manufacturing plants in the Cincinnati district has been increased during the year 1906 by \$30,000,000. The total value of all improvements for which building permits were issued during the year is \$7,101,866. Of this amount approximately 14 per cent. has been for manufacturing plants, aggregating about \$1,012,000. These figures, however, do not include some of the most prominent improvements of the year, such as the large new plants of the Globe Soap Company and the Remmers Soap Company at Ivorydale, and the additions made to the plants of the L. Schreiber Sons Company, Globe-Wernicke Company, Bullock Electric Company, Philip Carey Mfg. Company, which have been made outside the city limits. One of the striking features of the year was the organization and successful launching of the Factory Colony Company, an enterprise of such importance and magnitude as to be more than of local interest. By the consummation of this deal, involving an immediate investment in land and buildings of \$1,000,000, there has been opened up for factory purposes 100 acres of land beyond what has heretofore been deemed the outlying industrial district, yet within easy reach of the city."

Cincinnati will be well represented at the annual meet-

ing of the National Metal Trades Association to be held in Boston March 21 and 22. There is some talk of changing the headquarters from this city to Pittsburgh or Cleveland, but this may perhaps be but rumor and the home office be left as at present.

Machinery is being purchased by the Cincinnati Planer Company, Cincinnati, Ohio, for both its present plant and the new one it is building in the factory colony at Oakley, a suburb of Cincinnati. In its present plant the company has just added a 6-ton Sprague electric traveling crane, 48 in. by 18 ft. four-head variable speed planer of its own make and a 72-in. Gould & Eberhardt gear cutter. Orders have been recently placed for the following machinery for its new plant: One 15-ton Alliance traveling crane, one 24 in. by 16 ft. and one 18 in. by 8 ft. patent head Lodge & Shipley lathe, one 19 in. by 8 ft. Greaves & Klusman lathe, one No. 3 Cincinnati plain milling machine, one 36-in. and one 5-ft. Bickford radial drill, and one 42-in. Colburn boring mill. In addition to this machinery the company will install a considerable number of new tools, among which will be several of its own planers, a floor boring and drilling machine, a 72-in. gear cutter, keyseater and several lathes. It is expected that the new plant will be in operation by July 1.

The Nute Foundry Company, Cuyahoga Falls, Ohio, will buy considerable mechanical equipment for its new foundry, including one 10-ton electric crane, one 50-hp. motor, one 54-in. cupola, one 10-ton, one 5-ton and one 2-ton ladle, one blower, one cleaning mill and one elevator.

New England Machinery Market.

WORCESTER, MASS., January 29, 1907.

The past week has been one of changing prices, as notices of advances by the machine tool builders have been received by the dealers. The tendency has been to hasten the closing of some machinery orders. Apart from these no changes in general conditions have been noticed. The dealers report the usual volume of inquiries.

It is stated that a number of machine tool lists, which would have been issued before now, have been held back indefinitely, probably until next year, because of the hopelessness of getting complete equipments this season. This does not result at all from advanced prices, but from conditions of deliveries. Some new industrial building has been deferred for the same reasons. A few users of machine tools state that they are holding off until next year to see how things will be at that time, intending to get along in the meanwhile the best they can in handling their business. These instances, however, are exceptions to the rule. Manufacturers have been forehanded in many cases, and placed their orders months ago for some of the machinery which will go into equipment this season. Otherwise it would be a doubtful outlook for those who wish to buy certain classes of machinery, such as milling machines, some of the grinders, turret machines and other automatics, which are practically out of the market. Those who did not take the precaution to order early will have difficulty in getting together a complete machine tool equipment.

In the new prices lathes, planers, radials, upright drills and certain shapers are affected, as well as some miscellaneous tools, the average increase in price being about 5 per cent. With some tools dealers have been given new prices which went into effect immediately. Other machine tool builders have withdrawn all quotations, pending the issuing of new lists. Still others have given dealers more leeway, in order that they may have the chance to close pending deals at the prices which they had quoted their customers. Some prices were announced to go into effect in a week or 10 days. In some instances where prices became operative immediately the exception was made of pending deals.

Dealers feel that they should be protected where negotiations have been pending with a customer, who may be at the very point of closing the order. The withdrawal of quoted prices by the dealer may knock business in the head, where otherwise there was certainty of an order. The answer made is that were dealers told in advance of the projected increase in prices the temptation would be for them to tip their customers to place orders immediately, which would deluge the shops with business that they do not want at this time, certainly not at the old prices. It is well understood that a factor in this latest advance is the discouragement of business.

Some dealers are giving a good deal of thought to the effect upon their business of orders accepted for delivery far in the future. One prominent Boston house is contemplating refusing to accept orders on such tools as may be considered well out of the market. The plan is, instead of booking orders, to place the customer's wants on memorandum, with the agreement that each shall take his turn if they shall be still desirous of taking the machines when the time comes to put the castings in the works, when formal orders will be booked, which means three or four months

before delivery. As some manufacturers have adopted this memorandum system for tools that cannot be delivered before 1908, similar action by the dealers would be an entirely natural one.

The C. A. Dreisbach Foundry & Machine Company has been organized at New Haven, Conn., to manufacture structural, machinery, furnace and hardware castings. It is a Connecticut corporation, with \$20,000 capital stock. The incorporators are Charles A. Dreisbach, recently with the McLagon Foundry, Augustus L. Williams, and George W. Hall. The company will establish a foundry for gray iron work, and will operate a machine shop to do work in connection with casting contracts. The works will be located in New Haven, on a site which will give both water and railroad facilities. Further details of the plans are not yet ready for announcement.

The Ruggles Machine Company, Poultney, Vt., manufacturer of slate and stone working machinery and gasoline engines, has built an addition to its machine shop for the purpose of installing new machinery, especially for the manufacture of gasoline engines and slate working machinery.

Giza Erdelyi, whose present address is Hopedale, Mass., is making inquiries in the Boston market for machine tools to equip works in Hungary.

The machine tools and general equipment of the Rhode Island Motor Company, Providence, R. I., will be sold at auction Thursday, indicating that the company will go out of business. Another auction, which will attract a large attendance, is that of the machine equipment of the James Brown Machine Company, Pawtucket, which also comes Thursday.

The Coe Brass Company, Torrington, Conn., will begin work on its new reinforced concrete machine shop as soon as the weather is suitable for the purpose.

Fay & Scott, Dexter, Maine, manufacturers of machine tools, suffered a loss of about \$3000 by a fire January 24 which destroyed the roughing, chucking and polishing department. Little interference with production in the machine shops resulted, but the foundry was compelled to shut down for a week or so, owing to the fact that the blower was located in the damaged building.

There is an apparently well authenticated report that the New York Central Railroad is negotiating for the purchase of the Park Square Station property of the New York, New Haven & Hartford Railroad, and proposes to occupy the premises for its Boston terminal, the New Haven road being in need of all the facilities afforded by the South Station, which is used in common by the two systems. If this proves to be the case the New York Central, or, rather, its subsidiary company, the Boston & Albany, will have to either make important improvements to the old station, long since abandoned by its owners, or erect a new station in its place. In either case it will undoubtedly be necessary to install a considerable power plant and to put in much other equipment which constitutes necessary adjuncts of the modern railroad station.

Word comes from Bridgeport that the Van Auken-Clavauc Company, Yonkers, N. Y., manufacturer of pumps, motors and steam specialties, proposes to erect new works at Bridgeport, where a site has been secured. The tract is a considerable one, located at the rear of the works of the Bridgeport Forge Company, and extends to the harbor, where with some dredging and the construction of a pier freight may be received and delivered to vessels.

The Consolidated Carpet Sewing Machine Company has been organized at Bridgeport, Conn., and proposes to establish a factory in that city for the manufacture of carpet sewing machines, rug exhibitors and store fixtures. The company's capital stock is \$100,000. The incorporators are W. E. Patchen, S. T. Velie and F. W. Ahrens, all of Bridgeport.

Government Purchases.

WASHINGTON, D. C., January 29, 1907.

The Bureau of Supplies and Accounts, Navy Department, Washington, will receive bids until February 12 for air drills, air hammers, drill grinder, oil pumps, &c., for the Eastern navy yards.

The Bureau of Yards and Docks, Navy Department, Washington, will receive bids until February 16 for two 750-kw. steam turbo generators for the Boston Navy Yard. The Commanding Officer, Fort Hancock, N. J., will receive bids until February 25 for metal and wood working machinery, electric motors, &c.

The Isthmian Canal Commission will soon call for bids under circular No. 349, for 60 track jacks, 24 screw jacks, 1 belt driven horizontal bending roll and 1 Yankee twist drill grinder to grind drills from 1/4 to 2 in. in diameter.

The following bids were opened January 18, circular No. 347, for supplies for the Isthmian Canal Commission:

Bidder 6, the Case Mfg. Company, Columbus Ohio; 15, General Electric Company, Schenectady, N. Y.; 23, Manning, Maxwell & Moore, New York; 28, Niles-Bement-Pond Company, New York; 46, Westinghouse Electric & Mfg.

Company, East Pittsburgh, Pa.; 54, Morgan Engineering Company, Alliance, Ohio; 58, A. L. Ide & Sons, New York.

Class 1. One noncondensing engine and one engine type revolving field generator. Bidder 15, \$11,770, 160 days; 46, \$11,462, no time; 58, except item 2, \$6350, 120 days.

Class 7. Five induction motors—Bidder 15, \$2429, 125 days; 46, \$2499, 90 days.

Class 10. Three single trolley electric cranes—Bidder 6, \$15,500, 210 days; 23, \$13,639, 168 days; 28, \$12,890, 200 days; 54, \$12,545, 150 days.

The following bids were opened January 22 for supplies for the navy yards:

Bidder 2, the American Hoist & Derrick Company, St. Paul, Minn.; 23, Berry & Aikens, Philadelphia, Pa.; 24, Bergin Point Iron Works, New York; 31, Brown Hoisting Machinery Company, New York; 34, Berger-Carter Company, San Francisco, Cal.; 38, George F. Blake Mfg. Company, New York; 39, Baker & Hamilton, San Francisco, Cal.; 42, Crocker-Wheeler Company, Ampere, N. J.; 48, Chicago Pneumatic Tool Company, New York; 60, Columbia Pneumatic Tool Company, Cleveland, Ohio; 67, M. T. Davidson, Brooklyn, N. Y.; 70, D'Oiler Engineering Company, New York; 75, Exeter Machine Works, New York; 88, General Pneumatic Tool Company, Monteur Falls, N. Y.; 89, General Electric Company, Schenectady, N. Y.; 91, A. D. Granger Company, New York; 92, G. & W. Mfg. Company, New York; 95, R. W. Geldart, New York; 103, Handlan-Buck Mfg. Company, St. Louis, Mo.; 105, Henshaw, Buckley & Co., San Francisco, Cal.; 111, Hoshier Platt Company, New York; 113, Ingersoll-Rand Company, New York; 115, Independent Pneumatic Tool Company, Chicago, Ill.; 124, Lenher Engineering Company, New York; 138, Motley, Green & Co., New York; 148, Manning, Maxwell & Moore, New York; 149, Manhattan Supply Company, New York; 152, National Electric Supply Company, Washington, D. C.; 159, Northern Electric Mfg. Company, Madison, Wis.; 161, Niles-Bement-Pond Company, New York; 163, New Jersey Foundry & Machine Works, New York; 169, Pittsburgh Pneumatic Company, Canton, Ohio; 170, Pilling Air Engine Company, Detroit, Mich.; 172, Pneumatic Appliance Company, New York; 174, Pittsburgh Industrial Iron Works, Pittsburgh, Pa.; 175, Power Specialty Company, New York; 176, Prentiss Tool & Supply Company, New York; 197, Standard Scale & Supply Company, Pittsburgh, Pa.; 200, B. F. Sturtevant Company, Hyde Park, Mass.; 218, Sprague Electric Company, New York; 222, Taber Mfg. Company, Philadelphia, Pa.; 234, Vermilye & Power, New York; 237, Westinghouse Electric & Mfg. Company, Baltimore, Md.; 247, Williamson Bros. Company, Philadelphia, Pa.; 248, J. H. Weil, Philadelphia, Pa.; 253, Ernest Weiner, New York; 254, Woonham-Magor Engineering Works, New York; 258, Babcock & Wilcox Company, Philadelphia, Pa.

Class 1. Twenty-five self-dumping steel cable cars—Bidder 24, \$11,180 and \$10,845; 111, \$9350; 253, \$8325; 254, \$7625.

Class 2. Two hoisting engines—Bidder 2, \$2450; 75, \$2200; 91, \$2288; 124, \$2256; 138, \$2330 and \$2500; 174, \$2298; 234, \$2310; 247, \$2520.

Class 21. One single steel plate planing mill exhaustor—Bidder 70, \$325; 103, \$275; 159, \$275; 200, \$492.50; 218, \$260.

Class 22. One direct current motor—Bidder 42, \$457; 89, \$330; 159, \$375; 218, \$440; 237, \$349.

Class 23. Two Monitor rolling mill scales—Bidder 39, \$248.80; 148, \$244.80; 197, \$203.

Class 24 1/2. Six Helwig motor end drills—Bidder 34, \$720; 105, \$744.

Class 46. Two vertical single cylinder steam pumps—Bidder 38, \$298; 67, \$196; 152, \$242.

Class 153. One engine lathe—Bidder 161, \$405.

Class 154. One emery grinding machine—Bidder 92, \$63; 103, \$51.

Class 212. One U. & W. piston air drill—Bidder 23, \$260; 48, \$90; 60, \$135.

Class 229. Eight superheaters for eight 100-hp. Babcock & Wilcox boilers—Bidder 175, \$3775; 258, \$4126.

Class 234. Twelve triplex ammunition trolley hoists—Bidder 31, \$1920; 95, \$1614; 149, \$1768.80; 163, \$1662.

Class 235. Twelve pneumatic hoists—Bidder 48, \$2880; 88, \$2029.20; 113, \$1890; 170, \$1920.

Class 236. Thirty pneumatic scaling hammers, 88 hammers for chipping and calking, 18 pneumatic hammers for riveting, 90 nonreversible drilling machines, 5 reversible pneumatic drilling machines, 20 pneumatic wood boring machines, 6 pneumatic holders-on and 4 angle gears—Bidder 113, a \$6816.36, b \$9163.91; 115, a \$7243.50, b \$11,006.68; 148, a \$5960.29, b \$5990.29, part bid; 169, a \$1593.21 part; 172, a \$5158.05.

Class 249. One Taylor-Newbold high speed saw—Bidder 222, \$110.

The following awards have been made for supplies for the navy yards, bids for which were opened January 2:

The Bailey-Libby Company, Charleston, S. C., class 11, one pipe threading machine, \$557.85.

The Fairbanks Company, New York, class 12, one single

automatic bolt cutter, \$252; class 14, one upright drill press, \$249.25.

The Warren Steam Pump Company, New York, class 21, three duplex salt water circulating pumps, \$1350.

The Fox Machine Company, Grand Rapids, Mich., class 22, one pattern makers' wood lathe, \$888.50.

The American Ship Windlass Company, Providence, R. I., class 42, one steam winch, \$1200.

Manning, Maxwell & Moore, New York, class 43, one steam drop hammer, \$1700.

The North Penn Iron Company, Philadelphia, Pa., class 44, three pumps, complete with engine and motor, \$6480.

William Sellers & Co., Philadelphia, Pa., class 79, one twist drill grinder, \$155.

Under bids opened December 18 for supplies for the navy yards, the Brown & Sharpe Mfg. Company, Providence, R. I., has been awarded class 41, one plain milling machine, \$1022.

Under opening of December 11 for supplies for the navy yards, the General Electric Company, Schenectady, N. Y., has been awarded class 138, one 35-hp. motor, \$625.

The following awards have been made for supplies for the navy yards under bids opened December 4:

The Chicago Pneumatic Tool Company, New York, class 57, three pneumatic hammers, \$195.

The Independent Pneumatic Tool Company, Chicago, Ill., class 58, 21 pneumatic drills, \$1188.

The Starting of the Carnegie Gas Engine.

Something over a month ago there was started at the Edgar Thomson Works of the Carnegie Steel Company, Pittsburgh, the first large gas power installation in America, using blast furnace gas and a double acting four-cycle gas engine of a large capacity. This event is of rather unusual importance as it marks the commencement of a new régime in methods of power generation of the United States Steel Corporation, which has already taken so prominent a stand in favor of the internal combustion type of prime mover. The starting of the Carnegie engine also is of further interest for the reason that it furnished an effective demonstration of the capabilities of the Westinghouse design for the work in hand. This design, however, was by no means an untried one, as a number of gas engine units of similar design, but smaller capacity (500 hp.) have been in operation elsewhere with success, but the Carnegie engine represents the first of the series of 12 large units (3000 hp.), which are now being built by the Westinghouse Machine Company.

The Carnegie blowing unit was started for the first time on December 7, and after a trying out period of only two days was then put into regular commercial service. Since then the unit has carried a commercial load during the regular daily run without developing external or internal defects, either in structure or operation. A rigid inspection of the working parts after a few days' run failed to uncover the least evidence of wear or excessive stresses, and during a month's daily operation no prematures or back fires have occurred.

In design the gas engine follows the same general lines as those of smaller Westinghouse units, previously described in the technical press. It is of twin tandem double acting style, with center hung flywheel, and with two air tubs arranged in "vis-a-vis" fashion opposing the two engine frames. The gas cylinders are 38 in. in diameter by 54-in. stroke, and the air cylinders are 60 in. in diameter; normal speed, 60 to 75 rev. per min. Engines of the same size are being constructed for electric work, in which case the air tubs are removed and a generator is mounted in the shaft next to the flywheel. The generator will have a rated capacity of 1500 kw., running at 75 rev. per min. Such a unit is now under construction for the Edgar Thomson plant. The generator will be solidly coupled and will deliver direct current at 250 volts.

Although this gas engine unit furnishes an uninterrupted supply of air for blowing purposes, the duty imposed upon it is by no means uniform. Owing to changes in the compactness of the furnace burden the air pressure must vary in proportion. The usual range is 14 to 20 lb. per square inch, except when the furnaces are tapped, when the pressure reduces to 5 lb. On the other hand, when the furnaces are closely packed the pressure

may increase to 20 lb. These variations in pressure delivery are accompanied by corresponding variations in the quantity of air delivered, all of which is taken care of by the valve gear, while the speed of the engine is entirely under the control of a sensitive centrifugal regulator designed upon the relay principle, but controlling the gas inlets individually and directly at the point of gas supply. A speed changing mechanism provides means for manual control of the speed of the blowing unit when desired.

Compressed air is employed as usual for starting, and it is a point worthy of note that this large unit has been started and placed under full load in 53 sec. from the time of turning on the air, while 1 min. is ordinarily sufficient. As the starting is automatic only gas and air valves require the attention of the operator at the time of starting, no other parts of the engine needing manipulation.

Much experience has developed during the past two or three years in the operation of large gas engines on natural gas. It is, however, a point worthy of note that the use of "dirty" gas, either producer or blast furnace, is a very different problem, so difficult as to establish a narrow margin between success and failure, where the necessary experience in its use has not previously been acquired. But in adopting the large gas engine as a standard form of prime mover in steel plants the Carnegie Steel Company has not been blindly dependent upon the skill of gas engine designers. For a long period a 500-hp. Westinghouse gas engine of design similar to the large unit was maintained in daily operation at the steel plant for purposes of experimentation. Experience derived from the operation of this smaller unit gave unusual promise, which seems to have already been fulfilled in the operation of the large unit. During a 30-day test of 24 hr. per day, including Sundays, this experimental unit sustained a regular commercial load, with but two stops (equivalent to a run of 99.1-3 per cent. of the elapsed time). One of these stops was due to the failure of the gas supply. At the end of this run the engine was found to be in excellent condition, no unusual wear had developed at any point and all moving parts were working freely. This excellent record is not a little due to the effectiveness of the lubrication and cooling systems which have been devised for this double acting design of engine.

From every standpoint the results that have been achieved with the use of blast furnace gas at the Edgar Thomson Works constitute nothing less than a vindication, not only of the design but also of the action of the Steel Company in adopting gas engines for general motive power throughout every department of its works.

The Erie Railroad Introduces Electric Power.—Last week officials and experts of the Westinghouse Electric & Mfg. Company visited Rochester, N. Y., for the purpose of witnessing the initial test of the new electric motive power system now being installed by the Erie Railroad over its Mt. Morris-Rochester branch line, which is about 94 miles long. This is considered the entering wedge for the installation of electric motive power on the Erie system. About a year ago the company decided to install electricity on this branch and selected the Westinghouse alternating current single-phase system. The initial test run was made from Rochester to Avon, a distance of 19 miles, and was successful. This installation has attracted attention among railroad men because of the fact that it is the first application of an 11,000-volt alternating current to electric traction.

An Australian correspondent states that a blast furnace is being erected at Lithgow, New South Wales, with a view to enabling Australia to manufacture its own iron. Freights, however, are so low from Europe to Australia and so scarce at that that shipowners are often glad to carry manufactured iron for ballast, and this is one of the chief factors which will tend against profitable local iron production. He confirms the recent report that about 1800 tons of South Australian iron ore were recently shipped to Europe for testing purposes. The shipment is stated to contain 66 per cent. of metallic iron and the deposit of ore is one which can easily be worked.

The Naval Appropriation Bill.

WASHINGTON, D. C., January 29, 1907.—The House Committee on Naval Affairs has reported the annual naval appropriation bill, which will probably be acted upon by the House within the coming week. The measure carries \$96,167,155, or about \$6,000,000 less than was appropriated a year ago. The programme adopted by the committee for the increase of the navy is a very modest one, and involves an appropriation nearly \$11,000,000 less than that for the current year.

This feature of the bill authorizes the President to have constructed, by contract or in navy yards, as herein-after provided, one first class battleship similar in all essential characteristics, and additional to, the battleship authorized by the act making appropriations for the naval service for the fiscal year ending June 30, 1907; two torpedo boat destroyers, to have the highest practicable speed, and to cost, exclusive of armament, not to exceed \$850,000. All their parts shall be of domestic manufacture; the steel material shall be of domestic manufacture, and not more than one of the vessels shall be built by one contracting party. It is provided that the Secretary of the Navy may build any or all of the vessels in such navy yards as he may designate, "and shall build any of the vessels in such navy yards as he may designate should it reasonably appear that the persons, firms or corporations, or the agents thereof, bidding for the construction of any of said vessels, have entered into any combination, agreement, or understanding the effect, object, or purpose of which is to deprive the Government of fair, open, and unrestricted competition in letting contracts for the construction of any of said vessels."

Ordnance, Construction and Engineering Bureaus.

The provisions of the bill regarding the Bureau of Ordnance are of special interest. They provide a total appropriation of \$10,185,206, as compared with \$7,658,006 a year ago. The largest single item is \$4,000,000 for producing and handling ordnance material. For new and improved machinery for the naval gun factory at Washington the sum of \$150,000 is appropriated, and \$39,000 is allotted for the purchase of machine tools for the Boston Navy Yard. The sum of \$500,000 is provided for the purchase and manufacture of smokeless powder. An appropriation of \$250,000 is made for the purchase and manufacture of reserve torpedoes and appliances. The Chief of the Bureau of Ordnance is of the opinion that he can manufacture 21-in. torpedoes for \$3500 each, which would be a saving of \$1500 on each torpedo as now purchased from private contractors, and, as a large number are required by the navy, the committee has decided to permit the bureau to make a very thorough test of their economical production by the Government.

For the improvement of construction plants at the various navy yards, the bill carries the following sums: Portsmouth, N. H., \$15,000; Boston, Mass., \$20,000; New York, \$20,000; League Island, \$15,000; Norfolk, \$12,000; Pensacola, \$15,000; Mare Island, \$10,000; Puget Sound, \$15,000; Charleston, S. C., \$20,000; New Orleans, \$20,000. The bill carries the sum of \$7,900,000 for the construction and repair of war ships, but a provision has been inserted limiting the cost of repairs on the steel ships of the navy to 20 per cent. of the estimated cost of a new ship of the same size and like material.

Provision is made for the improvement of steam engineering plants at the following navy yards and stations: Portsmouth, \$30,000; New York, \$40,000; League Island, \$25,000; Norfolk, \$25,000; Pensacola, \$10,000; Cavite, P. I., \$25,000; Olongapo, P. I., \$20,000. For steam machinery for construction and repair of war ships the sum of \$3,500,000 is provided.

No Government Armor Factory.

No provision is made in the bill looking to the construction by the Government of an armor plant, and thus far the House Committee has taken no action upon the report recently submitted to Congress by the Secretary of the Navy, embodying estimates of the cost of constructing a Government armor factory and the probable expense of producing armor plate therein.

W. L. C.

The Annual Meeting of Milwaukee Metal Trades.

The annual meeting and banquet of the Milwaukee Metal Trades and Founders' Association was held Friday evening, January 18, at the Plankinton House in that city, and was attended by nearly 100 members and representatives of various departments of the firms holding membership in the organization. The reports of the officers for the year closed showed a healthy condition, notwithstanding the trying ordeal through which it has passed in the determined stand it took in opposition to the demands of the striking molders. At the business meeting, held prior to the dinner, the following officers were elected: President, Gen. Otto H. Falk, vice-president of the Falk Company; vice-president, S. L. G. Knox, general manager of the Bucyrus Company; treasurer, Hugo Froelich, Speich Stove Repair Company. The new directors of the foundry section are Fred M. Prescott, president of the Prescott Steam Pump Company; Geo. C. Forgeot, Allis-Chalmers Company, and Geo. H. Smith, president of the Geo. H. Smith Steel Casting Company. Of the machine shop section the directors are: H. Harnischfeger, Pawling & Harnischfeger; Theo. Vilter, president of the Vilter Mfg. Company, and E. J. Kearney, secretary of the Kearney & Trecker Company. The secretary, William J. Fairbairn, will be re-elected by the new Board of Directors.

At the dinner, Charles E. Sammond, vice-president of the Stowell Mfg. & Foundry Company, whose term as president of the association expired with this meeting, acted as toastmaster. He reviewed the strike experience through which the members had passed and said that the founders of Milwaukee had nothing to regret in the stand they had taken. Had they adopted a different course they would have demoralized the pattern making and machinery as well as the foundry trades. William G. Bruce, secretary of the Merchants' and Manufacturers' Association, spoke on "Character in Commerce"; A. J. Lindemann, Lindemann & Hoverson Company, on the "Milwaukee Trade School"; Richard B. Watrous, secretary of the Citizens' Business League, on "Milwaukee—a Bright Spot"; President O. P. Briggs of the National Founders' Association, on "Lessons of 1906." J. H. Cone of Cincinnati, assistant secretary of the National Metal Trades Association, extended greetings from Cincinnati, and W. H. Winslow, vice-president of the Chicago Foundrymen's Association, responded for the foundrymen of that city. C. A. Sercomb, the first president of the association, made some reminiscent remarks.

New Publications.

Handbook of Mathematics for Engineers and Engineering Students. By J. Claudel. Translated from the seventh French edition and edited by Otis A. Kenyon. Size, 6 x 9 1/4 in.; pages, 708. Cloth, \$3.50. Publisher, the McGraw Publishing Company, New York City.

The work endeavors to place at the ready command of the engineer the practical part of every branch of mathematics, and combining them in one book dispenses with repetitions of fundamentals, which are necessary when each branch is treated in a separate volume. The discouraging experience of every one who has tried to brush up his neglected mathematics to solve some special problem, in calculus, for instance, is what this handbook aims to overcome. It is primarily a reference book, and cross and interconnecting references are numerous to save the waste of time usual when the standard text books are referred to.

The body of the book is translated from Claudel's "Introduction à la Science de l'Ingénieur," a pocket book for engineers, architects and commercial men, and to it are added chapters on United States weights and measures, annuities, bank discounts, &c., and various tables.

HARDWARE

A SUBSCRIBER to *The Iron Age* asks: "How do your readers treat your advertising pages? In what way has it been found that Hardware merchants can use them to best advantage?" The question is a pertinent and suggestive one. We should like to be able to answer it, and invite correspondence from our readers on the subject. Many wideawake merchants could undoubtedly give us ideas along this line which would be of practical value and which we should, therefore, be glad to pass on to the trade.

That Hardware merchants do scan our advertising columns to their own advantage and to the advantage of the advertisers is, of course, obvious. Otherwise, the advertising space used by manufacturers and large distributors would shrink instead of steadily expanding. Unless the information afforded by our advertising columns and the classified index referring thereto proves valuable to them, merchants would not consult these columns and our advertising patrons would not get the results which encourage them to continue this method of attracting attention to what they have to offer. The proposition is a reciprocal one and needs no argument.

Observation has demonstrated that many Hardware merchants go through our advertising pages systematically, week by week, in search of new goods and changes in or additions to manufacturers' lines. Oftentimes letters are written, placing trial orders or requesting samples and quotations. Another general practice by merchants is to check advertisements that interest them and turn the copy of the paper over to a clerk with instructions to send for catalogues, price-lists, &c. We also find many Hardwaremen religiously thumbing our advertising pages from cover to cover, who tell us that this is one of the means they use to broaden their knowledge of the business, and keep up with the times.

Suppose it is desired to put in a line of goods not previously handled. The classified index to advertisers will doubtless furnish the desired names of manufacturers, while reference to their advertisements will afford more detailed information regarding their product. Frequently their quotations to the trade may also be found in our "Current Hardware Prices." The same is true in looking up or purchasing for a customer some article not carried in stock. Our advertising pages also are a sure index to seasonable goods in advance of their requirements, and direct attention to many specialties and novelties which may be handled with profit.

And if a study of *The Iron Age* advertising pages will assist an experienced Hardware merchant, certainly those who are new to the business or taking positions of increased responsibility and trust, to say nothing of young salesmen and inexperienced clerks, can obtain from this important department of the paper a most valuable education which, if intelligently used, will rapidly further their development as Hardwaremen and in the end increase their earning power. Merchants cannot fail to advance their own interests who make such information readily accessible to their employees.

As already stated, we should be glad to hear from our readers on this subject and to receive suggestions from merchants as to how they have found they can make use of the vast amount of trade information found in our advertising columns to the best advantage.

Condition of Trade.

Salesmen returned to their territories are sending in good orders for the general line. Mail orders in encouraging volume are also reported by all distributors. This buying is generally regarded as of a different class from that of a year ago, when prices were much lower and orders were being placed in anticipation of the advances which subsequently occurred. Few argue, however, that the liberal buying during the late fall was of a speculative character; instead the belief is held by good judges that merchants' purchases only reflected their increased trade and that their present stocks are no more than adequate to meet consumers' probable needs. This opinion is also supported by the general impression that the upward movement has run its course for the present at least and that a period of stability in prices is likely to succeed. Factory stocks of numerous staple commodities are still low, although manufacturers here and there report that they are accumulating certain classes of goods. The opportunity to do this is doubtless welcome in view of the stress of past months and the friction caused by constant pressure on the part of this or that customer to secure special favors in the way of deliveries. Advances are still occurring in the Copper market which are reflected in the prices of a number of goods handled by the Hardware trade. A continuance of winter weather, which, however, has not been so severe as greatly to impede transportation, is regarded as a favorable feature. Collections are fair.

Chicago.

Unabated activity, to express it in a phrase, is a brief, though none the less accurate, description of the state of trade in practically all Hardware lines. Jobbers generally report January sales to be in excess of those of the same month last year, and there is no valid reason to expect a reversal of the current prosperous trend of trade, so long as it is sustained by the present strength of consumers' demand. Seasonable goods, such as Wire Screens, Poultry Netting and Garden Tools, are moving freely on orders placed in the fall to provide for spring trade. Current buying continues strong, and orders for future requirements are coming in freely, though it is believed that dealers are not buying speculatively, or with the expectation of a largely increased demand. More or less difficulty is still experienced in keeping up stocks on account of delays in factory shipment, though difficulties of this sort are on the whole perhaps less pronounced than heretofore. On Galvanized Sheets, however, jobbers are obliged to anticipate their wants from two to four months. In accordance with advance announced by the American Sheet & Tin Plate Company, effective January 24, prices on Galvanized Sheets have been advanced 10 cents per 100 pounds, and Galvanized Roofing 10 cents per square. A rise of 1 cent per pound in Sheet Copper is noted, the price now being 30 cents. The recent advance in Screws of 5 per cent., effective on all grades, has been long expected, as notwithstanding the steady advance in price of Steel, Brass and Bronze Rods, there has been no change in the price of Finished Screws since May 23, 1906. Sisal Rope has been marked up $\frac{1}{2}$ cent a pound in this market, and prices on Light Brass Chain are withdrawn, quotations being made on application. Weather conditions adverse to building operations have not seriously interfered with the demand for Builders' Hardware, and deliveries on regular goods are being made with promptness. Orders for Nails are coming in freely, and Cut Nails are scarce.

NOTES ON PRICES.

Wire Nails.—With many of the leading mills sold up to their capacity for the next 30 to 60 days, and a fair amount of new business, the deliveries are much behind. Some improvement is reported in car supply which will help to relieve the situation to some extent by affording additional means of making shipments. The market is firm and one independent mill is reported as receiving orders at a 10 cent premium above general quotations. Quotations are as follows, f.o.b. Pittsburgh, plus actual freight to point of delivery, 60 days, or 2 per cent. discount for cash in 10 days:

Carloads, to jobbers.....	\$2.00
Carload lots, to retail merchants.....	2.05

New York.—The local demand for small lots at store is somewhat quiet, and probably will continue so until the consumptive demand begins again. Merchants are buying just enough Nails to keep stocks assorted to meet the day to day requirements of their customers. Under these conditions prices are very satisfactorily maintained. New York quotations are: To retailers, carloads, on dock, \$2.19; less than carloads, on dock, \$2.33; small lots, at store, \$2.30.

Chicago.—Orders in undiminished volume continue to crowd mill capacities which, owing to the stoppage of several plants at different points for a few days last week by recent floods, were somewhat curtailed. With demands running neck and neck with full normal output, this brief interference has had a tendency to still further delay shipments which are now being made in from 30 to 60 days. Prices are unchanged and are as follows: \$2.15 in car lots to jobbers, and \$2.20 in car lots to retailers, with an advance of 5 cents for less than car lots from mills.

Pittsburgh.—A fair volume of new tonnage is being placed, but the mills are running mostly on specifications on contracts which are coming in freely. The local supply of cars is improving, and shipments by the mills are correspondingly heavier. Practically all of the leading Wire Nail concerns have their product sold up for the next two or three months or longer and are much behind in deliveries. A leading independent is asking a premium of 10 cents per keg over official prices and is reported to be entering some business for forward delivery. The market is very firm, but there are no definite intimations as yet of another advance in prices. Quotations are as follows, f.o.b. Pittsburgh, plus actual freight to point of delivery, 60 days, or 2 per cent. discount for cash in 10 days:

Carloads, to jobbers.....	\$2.00
Carload lots, to retail merchants.....	2.05

Cut Nails.—New orders are being received by the mills in fair volume, but the energies of manufacturers are largely devoted to filling specifications on contracts. The market is firm, and a report is current of one mill asking a premium above general quotations. Mills are behind on deliveries, and stocks are especially light on certain sizes. Quotations are as follows, f.o.b. Pittsburgh: Carload lots, to jobbers, \$2.05; less than carloads, to jobbers, \$2.10; less than carloads, to retailers, \$2.20. Iron Cut Nails at points west of Buffalo and Pittsburgh are held at 10 cents advance on Steel Cut Nails.

New York.—The demand in the local market continues light, as there is a small consumption at this season. Jobbers are generally holding to quotations, rather than sacrifice their stocks to meet occasional competition, owing to the difficulty of replenishing stocks from mill. Jobbers' quotations are on the basis of \$2.30 for small lots at store.

Pittsburgh.—The Cut Nail Association at its meeting last week decided that prices of Cut Nails should be advanced to conform to any higher prices made by the Wire Nail mills. New business is fairly large, but the mills are running mostly on specifications on contracts, which are heavy. Stocks held by the mills and also by jobbers are extremely light on certain sizes. The market is firm, quotations being as follows, f.o.b. Pittsburgh: Carload lots, to jobbers, \$2.05; less than carloads, to jobbers, \$2.10; less than carloads, to retailers, \$2.20. Iron Cut

Nails at points west of Buffalo and Pittsburgh are held at 10 cents advance on Steel Cut Nails.

Barb Wire.—Specifications on contract orders are being received in large volume by the mills, with requests for prompt shipment. New business is comparatively light. The market is strong and reports are to the effect that some mills are asking premiums over official quotations. Quotations are as follows, f.o.b. Pittsburgh, 60 days, or 2 per cent. discount for cash in 10 days:

	Painted.	Gal.
Jobbers, carload lots.....	\$2.15	\$2.45
Retailers, carload lots	2.20	2.50
Retailers, less than carload lots.....	2.30	2.60

Chicago.—Increasing urgency of jobbers is stimulating the movement of Barb Wire. Stocks not overly well supplied will soon feel the drain of consumers' requirements and the mills are on this account being pressed for early deliveries. Quotations: Jobbers, Chicago, car lots, Painted, \$2.30; Galvanized, \$2.60; to retailers, car lots, Painted, \$2.35; Galvanized, \$2.65; retailers, less than car lots, Painted, \$2.45; Galvanized, \$2.75; Staples, Bright, in car lots, \$2.25; Galvanized, \$2.55; car lots to retailers, 10 cents extra, with an additional 5 cents for less than car lots.

Pittsburgh.—The supply of cars has materially improved and shipments by the mills are heavier than for some time. New demand is light but the large trade is specifying liberally on contracts placed some time ago before prices were advanced. The tone of the market continues strong and we are advised that some mills are asking premiums over general prices. Quotations are as follows, f.o.b. Pittsburgh, 60 days, or 2 per cent. discount for cash in 10 days:

	Painted.	Gal.
Jobbers, carload lots.....	\$2.15	\$2.45
Retailers, carload lots	2.20	2.50
Retailers, less than carload lots.....	2.30	2.60

Smooth Fence Wire.—The mills are still much behind on contract deliveries, but a better car supply is enabling them to make shipments in larger volume. New demand is light. Quotations are as follows, f.o.b. Pittsburgh, 60 days, or 2 per cent. discount for cash in 10 days:

Jobbers, carloads	\$1.85
Retailers, carloads	1.90

The foregoing prices are for base numbers, 6 to 9. The other numbers of Plain and Galvanized Wire take the usual advances, as follows:

	6 to 9	10	11	12	12½	13	14	15	16
Annealed.....Base.	\$0.05	.10	.15	.25	.35	.45	.55		
Galvanized.....	\$0.30	.35	.40	.45	.55	.65	1.05	1.15	

Chicago.—In common with other Wire products, Smooth Wire is in good demand and the activity noticed in other lines is fully shared by this product. Quotations are unchanged as follows: In car lots, to jobbers, \$2, f.o.b. Chicago, and to retailers, \$2.05.

Pittsburgh.—New demand is only fair, but the mills have a large tonnage on their books on contracts on which buyers are specifying freely. The car supply is better and shipments by the mills are heavier, but they are still much behind in deliveries. Quotations are as follows, f.o.b. Pittsburgh, 60 days, or 2 per cent. discount for cash in 10 days:

Jobbers, carloads	\$1.85
Retailers, carloads	1.90

The foregoing prices are for base numbers, 6 to 9.

File and Tool Handles.—J. L. Osgood, 121-138 Erie County Bank Building, Buffalo, N. Y., lists his Indestructible File and Tool Handles as follows, from which a discount of 10 per cent. is allowed the retail trade:

No.	Inches long.	For Files. Inches.	Per gross.
1.....	4	4 to 6	\$8.00
2.....	4½	6 to 8	8.50
3.....	5	8 to 10	9.00
4.....	5½	10 to 14	9.50
5.....	6	14 to 20	10.00

In less than gross lots, 5 per cent advance is charged.

Rope.—During the month of January the demand has kept up wonderfully well, and, in fact, the late fall did not experience the gradual diminution in business that usually is in evidence at that season. Prices are held

to very closely. Quotations are as follows: Pure Manila, 13 to 13½ cents; B quality, 12 to 12½ cents; Pure Sisal, 9¼ cents; No. 2 quality, 7¾ to 8 cents; No. 1 Jute, ¼ in. and up, 9 cents; No. 2 Jute, 8½ cents.

Tacks.—A steady toning up of quotations on Tacks continues to be observed and is reflected to an increased extent in jobbers' prices. American Carpet and Cut Tacks are now pretty generally quoted on a base of 90 and 30 per cent., and Upholsterers' Tacks, &c., on a base of 90 and 40 per cent.

Cast Iron Hardware.—By concerted action of leading manufacturers of Cast Iron Hardware advances of from 5 to 10 per cent. have been put in force on certain classes of goods. These include Well Wheels, Hay Fork Pulleys, Blind Hinges, Gate Hinges and Latches, &c.

Spoiled Wire.—Owing to further advances in the price of raw material, manufacturers of Spoiled Wire have made a 5 per cent. advance in their prices on brass and copper lines. The change does not include tinned and annealed Wire.

Spring Balances.—Leading manufacturers of Spring Balances have advanced their quotations on the common classes of goods about 7½ per cent. Discounts of from 50 to 50 and 10 per cent. may now be taken to represent the market to the retail trade.

Conductor Pipe and Eaves Trough.—The advance of Sheet Copper to a base of 30 cents per pound has been reflected by an advance in Copper Conductor Pipe and Eaves Trough, which is made effective by the associated manufacturers. Published discounts are now as follows:

Eastern territory	30 %
Central territory	20 and 10 %
Western and Southern territory	20 and 7½ %
Southwestern territory	20 and 5 %

Whether the recent advances in Galvanized Sheets will influence the price of Galvanized Pipe and Trough is not yet apparent.

A. H. Green Company.—A revised price-list on its Interchangeable Hardware Shelf Boxes has been issued by A. H. Green Company, 97-101 Warren street, New York. Advances of from one cent to six cents per Box are shown in a list which is subject, as before, to a discount of 50 per cent.

Window Glass.—The production of factories identified with the National Brokerage Company is said to be ahead of the demand. The difficulty with the workmen, to which reference has previously been made, has not as yet been overcome. A meeting of the manufacturers is scheduled to be held this week, at which it is expected that a decision will be reached as to the policy to be pursued in relation to the foregoing conditions. It is intimated that it may be considered best to close the factories for a short time in order to bring about a more desirable state of affairs. Quotations for carload lots are as follows: Single strength, 90 per cent.; double strength, 90 and 5 per cent. discount from manufacturers' list. Local demand is light and jobbers' quotations, from jobbers' list October 1, 1903, are as follows: Greater New York, 90 and 10 per cent. discount for all sizes, single and double strength; outside of Greater New York, 90 and 5 for single and 90 and 10 per cent. discount for double strength Glass.

Linseed Oil.—The demand is confined to medium sized lots, as the rule, while crushers are not desirous of taking contract orders for shipments extending over any considerable period. Flax Seed has fluctuated down and up during the week, changes in price being less than a cent either way, and these have not affected quotations on Oil. New York quotations for jobbing lots are as follows, according to quantity. City Raw, 42 to 43 cents per gallon; Out of Town Raw, 40 to 41 cents per gallon. Boiled Oil is 1 cent a gallon over Raw.

Spirits Turpentine.—Local demand is light and confined to jobbing lots. Prices are unchanged in sympathy with a strong Southern market. New York quotations are as follows, according to quantity: Oil Barrels, 73 to 73½ cents; Machine Made Barrels, 73½ to 74 cents per gallon.

TRADE WINNING METHODS.

This department is for the description of approved methods of carrying on and extending business, and a cordial invitation is given to merchants to co-operate in the effect to make it suggestive and of practical use to the trade.

NEWSPAPER ADVERTISING OF AN OHIO MERCHANT.

JUNIUS W. HAMILTON, Bellefontaine, Ohio, has favored us with a collection of his newspaper advertisements, several of which are reproduced herewith in reduced size. Mr. Hamilton handles a very extensive

HAMILTON'S For Quality and Lowest Prices Everything in HARDWARE

5th WEEK—SPECIAL PRICES FOR THIS WEEK ONLY

A HOT IRON



A COLD HANDLE



\$1.50 asbestos lined sad irons hold the heat three times as long as ordinary irons.



50c hatchet, 35c



50c pocket knife warranted exceptionally 40c



10c spring balances, 8c



15c thermometers, 7c



Wire egg beater, 1c

Just Received a large shipment of Sidewalk Roller Skates

JUNIUS W. HAMILTON Anything in HARNESS

109 W. Columbus Ave. Phone 340

Special Prices for One Week Only—6-in. two column space.

line of goods, and makes a specialty of Harness, Saddlery and Horse Goods, as one of the advertisements shows. The expression "Everything in Hardware," frequently appears in connection with his announcements, and Hardware in his case is a very broad term and covers a wide variety of goods. It will be observed that one of the advertisements gives special prices, good for one week only. Mr. Hamilton makes a feature of this and every week offers a few selections from his stock at attractive

EVERYTHING
IN
HARDWARE.

Hamilton's

ANYTHING
IN
HARNESS.

TO-DAY

IS THE RIGHT TIME

To have your harness repaired RIGHT.

To have your harness oiled RIGHT.

To have your harness dressed RIGHT.

To buy light and heavy harness RIGHT.

To buy 6 A blankets and robes RIGHT.

To buy whips, combs, brushes RIGHT.

To buy the very best of Leather RIGHT.

To buy harness oil and dressing RIGHT.

ALL RIGHT

JUNIUS W. HAMILTON,

Leading Hardware and Harness Dealer.

109 W. COLUMBUS AVE.

PHONE 340.

Harness Goods—4½-in. two column space.

figures. So far as space is concerned he does not limit himself, and his announcements run all the way from a 4½-in. two column to a full two column space. Illustrations are almost invariably used, either of the goods themselves or of a sketchy character, as in the case of one of the advertisements shown.

POCKET CUTLERY WINDOW DISPLAY.

A RECENT notable show window exhibition of Pocket Cutlery was that of the Union Hardware & Electric Supply Company, Providence, R. I., a view of which is here given. The Knives used, 944 in all, were taken

Everything in
HARDWARE
HAMILTON'S
Anything in
HARDWARE



**Would You
Pick up
Money
If you saw it lying
In the Street?
Of Course
You Would!**

It is just as easy and more certain, for
you to pick up money in our store.

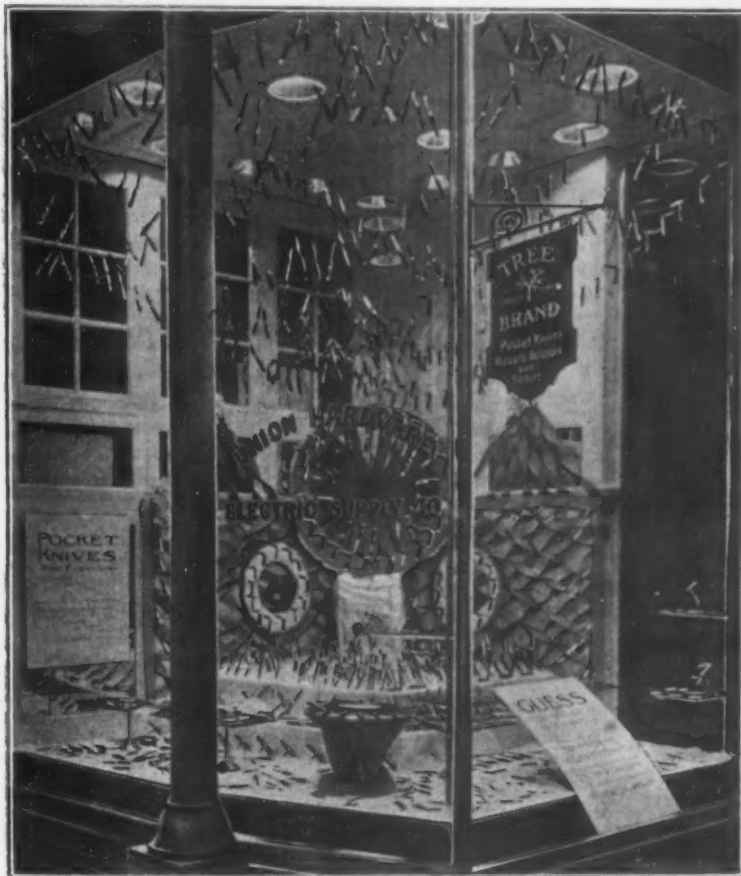
Money picked up with Blankets and Robes
Money picked up with Storm Froats
Money picked up with Anything in Harrods
Money picked up with Sausage Grinders
Money picked up with Lard Pans
Money picked up with Axes and Cutlery
Money picked up with Cross-cut Saws
Money picked up with Padlocks
Money picked up with Builders' Hardware
Money picked up with Paints, Oils, Varnishes
Money picked up with Shot Guns and Shells
Money picked up with Everything in Hardware

JOHN W. HAMILTON,
Leading Hardware and Hardware Dealer
109 West Columbus Ave. Bellefontaine, O.

Weather
Strip
10 per ft.

Picking Up Money Advertisement—6½ in. two column space.

from the company's store stock, Philip H. Robinson, manager of the Cutlery department, designing and arranging the display. The entire exhibit consisted solely of Tree-



A Show Window Display of Pocket Knives.

brand and Valley Forge Cutlery, both of which are manufactured respectively by H. Boker & Co., and the Valley Forge Cutlery Company, Solingen, Germany, and Newark, N. J. Notwithstanding the comprehensiveness of the

demonstration, it is said another window could have been trimmed at the same time, using as many kinds without duplication, from stock on hand.

The exhibit was especially strong in Pocket Knives retailing at \$1 each, although there were included Knives priced at from 50 cents to \$6 apiece, and, as was indicated by a placard in the window, there were Knives for every one, suitable for gentlemen, ladies, boys, girls, sportsmen, electricians, carpenters, plumbers, bankers, for vest pocket and office use, corn and combination Knives, together with Knives adapted for nurserymen in budding, pruning and grafting, &c. The mountings were stag, pearl, ivory, tortoise, sterling silver, buffalo horn, bone, ebony, and cocobolo. The background of the window proper was white, trimmed with white crepe paper, artistically draped and festooned. To intensify and individualize the interest a notice headed "Guess" was given prominence in the window, by which an offer of 11 Knives was made, to be given to whoever guessed nearest to the aggregate number of samples used, the competition being open to every purchaser in the Cutlery department. On a given date, it was announced, a \$2 Knife would be presented to the person guessing nearest to the exact figures, and to the other 10 guessing nearest, a \$1 Knife. We are advised that the Cutlery sales attributable to the enterprise were highly satisfactory.

AMONG THE HARDWARE TRADE.

The Hardware business of Wm. H. Weed, Vincennes, Ind., has been taken over by a new corporation, known as the Weed-Boechman Hardware Company, organized with a capital stock of \$10,000. Frank Boechman will assume the active management of the new concern.

The Hardware business of G. W. Chesnut, Danville, Ky., was incorporated January 1 with a capital stock of \$30,000, the style of the concern being changed to the Chesnut-Salter Hardware Company. The officers of the new company are: G. W. Chesnut, president; John A. Chesnut, vice-president, and Robert L. Salter, secretary and treasurer. Under the present management the business is both wholesale and retail, but with the organization of the new company the wholesale department will be extensively developed. The main store is 175 ft. in length and over it is a large wareroom, while beneath is a modern storage cellar 100 ft. in length. In addition there will be three warerooms, 40, 50 and 60 ft. in length, respectively, located on Lexington street, for the purpose of storing all surplus stock. In addition to the sale of Hardware and related lines a manufacturing business is conducted covering tin and sheet iron ware and general pipe work, a specialty being made of Water Tanks and Troughs.

Mitchell & Scholes, Granby, Mo., have been succeeded by Granby Hardware & Implement Company, W. W. Scholes, manager. The company has erected a brick and concrete building, 44 x 130 ft., with full basement, giving in all about 11,500 ft. of floor space. A number of new lines have been added, such as Implements, Vehicles, Gas Pipe and Fittings, Clocks, Silverware, &c., which it was impossible to carry before because of lack of room.

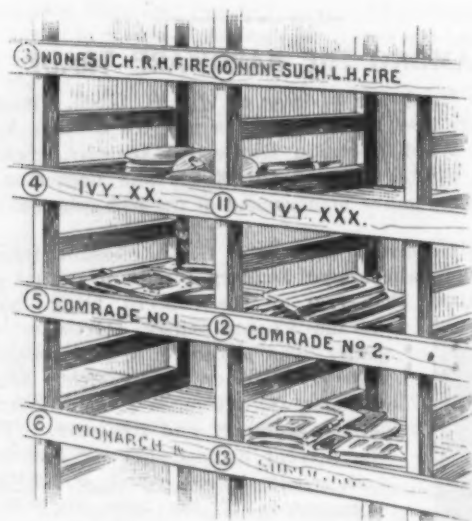
John A. Manson & Co., Burlington, Vt., have dissolved partnership, Mr. Manson retiring to engage in the real estate business in Brooklyn, N. Y. The business will be continued as the Manson Hardware Company under the management of E. H. Prouty.

EFFICIENT HANDLING OF STOVE REPAIRS.

FROM the experience of some who have tried it there is a profitable opportunity in many sections for a Hardware merchant who will make himself headquarters for Stove repairs. This is a line in which, judging from complaints frequently heard, the consuming public often find it difficult to secure prompt and satisfactory service. Many merchants seem to hold the short-sighted view that after they have sold a Stove they are through with it, forgetting the importance to the purchaser of being able to secure when wanted parts and fittings required as a result of accident, loss or wear. This is a mistake, not only because of the actual loss of profit on the repairs, but also because good service along this line helps to hold old trade and often acts as a feeder for new. It is the merchant who makes a specialty of repair work who knows where there is an opportunity to sell a Heater or exchange an old Range for a new one.

A Specialist's Methods.

Scott Hardware Company, Trenton, N. J., is a firm which conducts the Stove repair business in an enterprising way, and on account of its methods will doubtless be interesting and suggestive to many of our readers. The company makes a specialty of this class of work, and



Section of Bins Containing Stove Repairs.

has familiarized itself with all makes of Stoves used in Trenton and the surrounding country. Lining and parts for all makes and designs in any way common are

Regularly Carried in Stock

and the basement of the store is largely devoted to storing them. Any one acquainted with the Stove business is aware that such articles are not packed like Shelf Hardware in neat, labeled boxes, but are bulky and dirty and are shipped loose, often undistinguished by marks of any kind. Some means must be found to avoid spreading the dirt, while keeping all parts of the same Stove together in the same known place. This is not an easy matter, where so many styles and sizes must be accommodated, but the problem has been effectively solved by building

Tiers of Bins

with aisles between them, extending from floor to ceiling, and which occupy a large portion of the basement. The bins are perhaps 2 ft. wide by 2 ft. deep and 1½ ft. high. Each one is numbered and labeled, as shown in the accompanying cut, with the name and size or number of Stove the parts of which it contains. No care is required, of course, to arrange the Bricks, Cross Pieces, Grates, Lids, &c., in the bins. They can be thrown in any way, the only necessity being to get them in the proper compartment. An index, with diagram of the bins, is kept at the desk on the store floor, so that when a part is called for the clerks can find the number of the

bin and look up its exact location before going after it in the basement, thus saving the time which would be lost in aimless searching.

Outdoor Rack.

On the outside wall of the store facing a private driveway is a large rack of bins to accommodate the company's regular stock of Firebrick. This cannot be hurt by ordinary exposure, but at night and in stormy weather it is protected by a light frame, sliding front, covered with galvanized sheets and hung on common Barn Door Rail. This slide or door incloses the entire rack, which is perhaps 15 ft. long, 12 ft. high and 1½ ft. deep. The bins themselves are perhaps 3 ft. square, the upper tiers being reached by means of a Ladder. The ground tier is used for storing surplus stock of Sash Weights.

Special Orders.

Perhaps the most original and valuable feature of the company's Stove Repair business is its method of handling special orders for parts not carried in stock. Many such orders are of course received, and no little confusion and loss might result if they were not kept track of in a systematic manner, since they would be entirely useless except for the special purpose intended, or if the parties for whom they were ordered should fail to take them off the company's hands. Moreover, they usually have no distinguishing marks so that if they were once mixed up with other stock it would be very hard, if not impossible, to locate them. According to the company's system

Each Special Order Has a Number

given it when first taken and entered in the order book. This number refers to one of the empty compartments in a special rack of about 20 numbered bins built to accommodate orders of this kind. Manufacturers are instructed to put the number on their shipment, which when it arrives is immediately placed in the proper bin. A postal card is then sent out to the customer, advising him that his order, No. —, has arrived, and requesting him to call for it. When he does so the pieces can be located without loss of time, but if he delays they will remain out of the way in a place where they cannot be lost or mixed up with parts of other Stoves. At the same time they furnish a reminder for sending other notices or taking the first opportunity to deliver. The system of the company has been founded on many years' experience in handling Stoves and Stove Repairs, and has proved entirely practical and efficient for the requirements of their large business.

E. C. ATKINS & CO.'S FIFTIETH ANNIVERSARY.

E. C. ATKINS & CO., Indianapolis, Ind., manufacturers of Atkins Saws, have issued a handsome book in commemoration of their fiftieth anniversary. It is entitled "The Saw, Its Ancient and Modern Development." The binding is a clever imitation of a piece of sawed timber, with the grain of the wood correctly brought out, while high grade paper, cuts, type and artistic arrangement combine to make the production harmonious and effective in a high degree. Following a brief sketch of the world's industrial development leading up to the invention of the Circular Saw, an account is given of the ancestry, youth and business experience of E. C. Atkins, founder of the company. This introduces a history of the company, with brief sketches of the men who have been active in its management and are now directing its affairs. Some description of the present plant is accompanied by numerous handsome illustrations, while the concluding pages of portraits show the company's appreciation of its efficient clerical, mechanical and selling staff. The company is to be congratulated, not only on the event referred to, but on the beauty and good taste of its souvenir.

T. J. Houlehan, Crawfordsville, Ind., has sold his stock of Hardware and Implements to W. A. Moore, who will continue the business at the same location.

Retail Hardware Conventions.

During the next month or two the following retail Hardware conventions will be held. Where special arrangements have been made for Hardware exhibits by manufacturers and jobbers the fact is noted:

- NORTH DAKOTA RETAIL HARDWARE ASSOCIATION.** Meeting postponed until further notice, as explained below. Secretary, C. N. Barnes, Grand Forks.
- NEBRASKA RETAIL HARDWARE ASSOCIATION,** Omaha, the Auditorium, February 5, 6, 7. Hardware exhibition. Secretary, J. Frank Barr, Lincoln.
- KENTUCKY RETAIL HARDWARE AND STOVE DEALERS' ASSOCIATION,** Louisville, Galt House, February 5, 6 and 7. Secretary, John R. Sower, Frankfort.
- WISCONSIN RETAIL HARDWARE ASSOCIATION,** Milwaukee, February 5, 6, 7 and 8. Headquarters, Republican House; meeting and Hardware exhibition at Public Service Building. Secretary, C. A. Peck, Berlin.
- WEST VIRGINIA RETAIL HARDWARE ASSOCIATION,** Clarksburg, February 12 and 13. Secretary, J. H. Krepps, Morgantown.
- PENNSYLVANIA RETAIL HARDWARE ASSOCIATION,** Pittsburgh, February 12, 13 and 14. Headquarters, Monongahela House. Secretary, J. E. Digby, McKees Rocks.
- SOUTH DAKOTA RETAIL HARDWARE ASSOCIATION,** Mitchell, February 12, 13 and 14. Hardware exhibition. Secretary, Noah Kellar, Woonsocket.
- OREGON RETAIL HARDWARE AND IMPLEMENT DEALERS' ASSOCIATION,** Portland, February 13 and 14. Secretary, Henry J. Goff, Forest Grove.
- COLORADO RETAIL HARDWARE ASSOCIATION,** Denver, Albany Hotel, February 13, 14 and 15. Secretary, Adolph Unfug, Walsenburg.
- ILLINOIS RETAIL HARDWARE ASSOCIATION,** Chicago, February 14, 15 and 16. Headquarters, Lexington Hotel, meeting and Hardware exhibition at Colliseum. Secretary, Leon D. Nish, Elgin.
- CONNECTICUT HARDWARE ASSOCIATION,** Hartford, February 20 and 21. Secretary, J. De F. Phelps, Windsor Locks.
- NEW YORK STATE RETAIL HARDWARE ASSOCIATION,** Syracuse, The Alhambra, headquarters, the Yates, February 19, 20, 21 and 22. Hardware exhibition. Secretary, John B. Foley, Syracuse.
- IOWA RETAIL HARDWARE ASSOCIATION,** Des Moines, February 19, 20, 21 and 22. Headquarters, Savery Hotel; Meeting at Christian Church auditorium; Hardware exhibition at Shriners' Temple. Secretary, A. R. Sale, Mason City.
- INDIANA RETAIL HARDWARE ASSOCIATION,** Indianapolis, February 20, 21 and 22. Hardware exhibition. Secretary, M. L. Corey, Argos.
- OHIO RETAIL HARDWARE ASSOCIATION,** Columbus, February 26, 27 and 28. Headquarters, Southern Hotel. Hardware exhibition at Memorial Hall. Secretary, Frank A. Bare, Mansfield.
- MINNESOTA RETAIL HARDWARE ASSOCIATION,** St. Paul, Knights of Columbus Hall, February 26, 27, 28, March 1. Hardware exhibition. Secretary, M. S. Mathews, Boston Block, Minneapolis.

ASSOCIATION NOTES.

Among the papers which will be read at the Iowa meeting will be the following: "Shelf Displays," by J. P. Talcott, Williams; "How to Take Inventory," by Paul C. DeVoe, Council Bluffs; "Business Men and Local Politics," by L. C. Abbott, Marshalltown; "Stove Displays," by F. R. Currie, Mason City; "Competitive Trade on Standard Lines," by W. S. Thomas, Iowa City; "Elimination of Personal Antagonism in Local Competition," by C. E. Swaine, Council Bluffs. Approved window display and credits will also be subjects of general discussion. The Question Box will be in charge of a competent committee, comprising L.

Lindenburg, Dubuque; F. P. Bolinger, Afton, and L. C. Moore, Waverly. Addresses are also expected from C. W. Asbury, president of the American Hardware Manufacturers' Association; W. S. Wright, president National Hardware Association; E. M. Bush, president National Retail Hardware Association; C. A. Peck, secretary of the Wisconsin Hardware Mutual Insurance Company, and Hon. J. A. Smith, representing the Lumberman's Insurance Company. A railroad rate of one and one-third fare for the round trip has been secured, without certificate.

Owing to the very severe weather which has during the past week prevailed in North Dakota, completely tying up the railroad traffic throughout the State, it has been thought advisable to postpone the **North Dakota** conventions of the Hardware, Implement and Furniture Dealers' associations, which were scheduled to be held simultaneously in the city of Minot, February 4-6. No dates have yet been selected for the deferred meetings, but just as soon as the weather is such that it seems safe to name new dates, announcement will be officially made.

According to the formal programme of the convention, which is about to be issued, the Question Box discussion at the annual meeting of the Illinois Retail Hardware Association will be under the efficient charge of Charles H. Williams, Streator, a former president of **Illinois** the association. A special feature of the meeting will be an address by E. M. Bush, president of the National Retail Hardware Association. An able paper on window dressing is also expected from an expert in this line. The convention promises to be the largest and most interesting in the history of this great association, which now boasts of a membership in excess of 1100. On Wednesday evening, February 13, the Chicago Retail Hardware Association will give a complimentary ball and reception to the delegates and exhibitors attending the convention.

Among the speakers who will address the convention of the New York State Association will be George H. Sargent, Sargent & Co., New York; W. P. Bogardus, ex-president of the National Retail Hardware **New York** Association; Giles H. Stillwell, president Syracuse Chamber of Commerce; W. P. Foster, president Rochester Commercial Travelers' Association, and L. B. Elliott, advertising agent, Rochester. The Question Box Committee, consisting of L. G. Mattison, Newark; Irving Van Voorhis, Cobleskill, and William Fowler, White Plains, with a view to making general discussion of trade matters as interesting and instructive as possible, solicit suggestions as to topics from Hardware merchants generally throughout the State.

The Wisconsin Association's official programme just issued contains the following interesting **Wisconsin** "proclamation" from President Emil Teitgen:

Whereas, by virtue of our great prosperity and success as a State Association, it is again the privilege of our executive to set apart a period for rest, recreation and social intercourse; and taking advantage of such privilege, I hereby declare Tuesday, Wednesday, Thursday and Friday, February 5, 6, 7 and 8, 1907, respectively, "Wisconsin Hardware Dealers' Legal Holidays." Every Hardware merchant in Wisconsin, whether a member of this association or not, is cordially invited to spend these holidays at Milwaukee attending our eleventh annual convention.

Be sure to come. It is an excellent investment, and you'll never regret it.

COME—And put yourself in touch with what organized effort has done and is doing through our State and National organizations.

COME—And you will come in contact with the most energetic and prosperous men in the business—catch the spirit and be benefited.

COME—And give us the benefit of your presence and influence, and others will be benefited.

An interesting programme has been arranged and we need your co-operation to make this a grand success.

It also contains an interesting and characteristic "talk" from C. A. Peck, the popular secretary of the

association. In addition to Question Box and other discussions, there will be formal papers on "Business Methods," "Advertising," and "Stove Salesmanship."

The Coos County Hardware Dealers' Association, which was organized over two years ago, now embraces all of the Hardware merchants in Coos County, Ore.

The association will be represented by D. A. Huling, president, Myrtle Point, at the meeting called for February 11 at Portland, Ore., when the question of the formation of a Pacific Federation of Hardware and Implement associations will be determined. Mr. Huling will also attend the meeting of the State Retail Hardware and Implement Dealers' Association at Portland, February 13 and 14.

The fact that Ohio Hardwaremen are sending in a large number of suggestions as to topics for discussion under the head of Question Box indicates that they are taking more than usual interest in the approaching convention. Many letters are also being received by the secretary, expressing approval of the exhibit feature, and merchants intimate that they will avail themselves of the opportunity thus presented to inspect and add new lines to their stock where feasible. The entertainment side of the convention is not being neglected, and the evenings will be made as enjoyable as possible.

STEVENS ARMS ADVERTISING CONTEST.

WE are advised by the J. Stevens Arms & Tool Company, Chicopee Falls, Mass., that the following are the prize winning Hardware merchants in the Stevens Arms advertising contest, which has recently been concluded:

Leonard Hardware Company, Springfield, Mo., Shotgun.
Hoyt Hardware Company, Wellsville, N. Y., two Shotguns.
Lincoln Hardware & Implement Company, Kendrick, Idaho, two Shotguns and one Rifle.
G. M. Anderson, Inwood, Iowa, two Shotguns.
"Woodruffs," Knoxville, Tenn., Shotgun.
Peters Hardware Company, Emporia, Kan., three Shotguns.
F. H. Churchill, Roseburg, Ore., three Shotguns.
L. M. Burlison, Edmeston, N. Y., three Shotguns.
Malbone Hardware & Implement Company, South Haven, Mich., Shotgun.
John P. Pfaff & Sons, Anadarko, Okla., Shotgun.
R. J. Walken, Tottenham, Ont., two Shotguns.
Paul Newman, Hobart, Ind., two Shotguns and one Rifle.
Chas. Voehringer, 1285 Myrtle avenue, Brooklyn, N. Y., Shotgun and Rifle.
The Foster Company, Fall River, Mass., Shotgun and three Rifles.
M. W. Connor & Son, Madoc, Ont., two Shotguns and Rifle.
Rae Sims, Glens Falls, N. Y., two Shotguns.
Albert Nelson & Co., Allentown, N. J., Rifle.
E. E. Hunt, Mocksville, N. C., two Rifles.
Smith & Ziegler, Palmyra, N. Y., two Rifles.
John Nies, Holland, Mich., Rifle.
Treman, King & Co., Ithaca, N. Y., Rifle.
Frey's Sporting Goods Store, Baker City, Ore., two Rifles.
Sutter & Gamble, Burlington, Iowa, Shotgun.
F. M. Smith & Co., Fort Wayne, Ind., Shotgun.
D. A. Birkholz, New Auburn, Wis., Shotgun.
Mathews & Royalty, Gatesville, Texas, Shotgun and three Rifles.
Louis Hoffman Hardware Company, Vicksburg, Miss., Shotgun.
T. J. O'Brien Hardware Company, Latrobe, Pa., Shotgun and two Rifles.
Elite Cyclery, Reedley, Cal., Rifle.
O. P. Snyder, Bangor, Pa., Rifle.
Rinkieff Hardware Store, Sandusky, Ohio, Rifle.

It will be observed that in a number of instances several prizes were awarded to the same party or firm, this being permitted by the rules of the contest, merchants having been free to send in as many specimens of Stevens Arms advertisements as they desired. Altogether 100 prizes were distributed.

GILBERT E. RUSSELL, senior member of the Hardware firm of G. E. Russell & Co., died on the 26th inst., from Bright's disease. Mr. Russell was born in Biddeford, Maine, November 6, 1848. His family moved to Holyoke when he was quite young, and there he attended the public schools. Upon leaving school, he entered the employ of Snow & Co., Hardware merchants. Some years later he left Holyoke to enter the employ of White & Conant, Worcester, Mass.; and subsequently accepted a position with Burditt & Williams, Boston, with whom he re-

mained a year or two. In 1870 he returned to Holyoke and with his uncle Joel Russell bought out the old firm with whom he received his first training. They moved the business to a new stand, and established the present firm of J. Russell & Co. He remained with this firm until 1883, when he withdrew, and during October of the same year he started in business for himself. In 1889 he formed a partnership with A. J. Osborne, the firm style becoming G. E. Russell & Co. Mr. Russell was treasurer of the Holyoke Business Men's Association, a member of the Western Massachusetts Hardware Association, Holyoke Lodge of Odd Fellows, the Bay State Club, and the Holyoke Canoe Club.

PRICE-LISTS, CIRCULARS, Etc.

Manufacturers in Hardware and related lines are requested to send us copies of catalogues, price-lists, &c., for our catalogue department in New York; and at the same time to call attention to any new goods or additions to their lines, of which appropriate mention will be made, besides the brief reference to the catalogue or price-list in this column.

SMALL BROS., Dunham, Quebec, Canada: Illustrated catalogue relating to Maple Sugar Makers' Supplies, including Lightning Evaporators, Steel Arches, Sap Spouts, Gathering Tanks, &c.

NEWHALL SHIP CHANDLERY COMPANY, 186 Front street, New York: Catalogues, No. 40 referring to Marine Hardware, No. 41 referring to Tackle Blocks and No. 42 referring to Awning Hardware.

CHASE COLVIN, South Charleston, Ohio: Circular referring to Stay There Steel Anchor Posts for Wire Fences.

STAR EXPANSION BOLT COMPANY, 147-149 Cedar street, New York: Catalogue No. 16 referring to Star and Star Union Expansion Bolts, Screw Anchors, Cable Dogs, Toggle Bolts, &c.

THOMAS PEPPER, Hightstown, N. J.: Illustrated circular listing and describing the Perfection Six Row Horsepower Sprayer, Riggs' Furrowers and Plows, Pepper Two Row Sprinkler and Eclipse Barrel Pump.

FRANK KELLOGG, 563 Tenth street, Brooklyn, N. Y.: Illustrated circulars referring to Excelsior Jacks and Block Trucks.

SHELTON COMPANY, Shelton, Conn.: Illustrated catalogue and revised price-list referring to an extensive line of Common and Philadelphia Eagle Carriage Bolts, Machine and Miscellaneous Bolts, Billiard Table Bolts, Coach and Lag Screws, Bed Screws, Hot Pressed Nuts, Washers, &c., with useful tables of weights.

TOWER & LYON COMPANY, 95 Chambers street, New York: Pocket Tool list, with illustrations, descriptions and price-lists of an extensive line of Tools.

SEYMOUR MFG. COMPANY, Seymour, Conn.: Price-list No. 6 referring to Roll and Sheet Brass and German Silver, Brass and German Silver Wire and Tubing, High Brass Rods, &c., with tables of weights, gauges, &c.

AMERICAN SCREW COMPANY, Providence, R. I.: New discount sheet dated January 23, referring to Wood and Miscellaneous Screws.

It is officially announced that the Canada Screw Company and Ontario Tack Company, two of Hamilton's long established and largest industries, have been amalgamated under the name of the Canada Screw Company, Limited. It is the purpose of the new company to extend its buildings and plant and add to its already large line of products. A new charter has been applied for, which provides for an increase of capital stock to cover the expenditures contemplated, and when issued the company will be officered as follows: Cyrus A. Birge, president; Charles Alexander, vice-president; F. H. Whitton, general manager; W. F. Coote, secretary and treasurer; James Orr Callaghan, director of works.

HARRY W. NOBLE, Omaha, Neb., has been appointed manager of the American Radiator Company, California branch, with headquarters in San Francisco, from which point the territory embraced in California and Nevada is covered.

Inland Empire Implement and Hardware Association.

THE second annual convention of the Inland Empire Implement and Hardware Dealers' Association was held at the Hotel Spokane, Spokane, Wash., on the 16th and 17th inst. It was the best attended and most successful meeting in the history of the association, and was probably the largest convention of a trade organization ever held in the Pacific Northwest. The attendance numbered nearly 500, and nearly 400 persons sat down to the banquet, the remainder leaving on the evening trains.

President E. E. Lucas of Davenport, Wash., called the gathering to order on Wednesday morning, and then introduced Mr. Goodall, president of the Spokane Chamber of Commerce, who welcomed the visitors to the city in a felicitous address. I. C. Hattabaugh, Grangeville, Idaho, made an eloquent response on behalf of the association.

The Value of an Agency.

J. H. Abrams of the Winona Wagon Company made an address on the subject "The Value of an Agency," in part as follows:

In the first place, I believe the most valuable agency you have or can get is the agency that you represent here—this Inland Empire Implement and Hardware Dealers' Association. I believe that is the most valuable agency you can sign up a contract with, and if there are any dealers here that are not members of this association I want to say to you that you cannot close a contract for 1907 that will be more valuable to you than will be the signing of an application blank to become a member of this association. That is my firm conviction, from 25 to 30 years' experience in the implement business, not only as a manufacturer's agent, but as a retail implement dealer. I have been a member of various associations and know the value of an association of this kind.

"GENTLEMEN'S AGREEMENT."

Why is an agency valuable? The manufacturer or jobber can assist materially in making an agency valuable. We have adopted a plan that I think has worked out and shown good results, at least I think so, and some of my customers think so. I have a "gentlemen's agreement" among some of the dealers in this territory, whereby they agree to maintain the price on my product and agree not to sell it for less than that price; and I say it is several dollars higher than your association price for that particular article. I have said to them that if there is a dealer in their vicinity that refuses to maintain that price, and they will let me know of him, I will interview him. I have interviewed one or two successfully and the price has been maintained.

I think you will all agree with me when I say that Wagons are sold to-day at a smaller margin of profit to the dealer than any single item in your warehouse. I don't know why it is, and have been unable to find out why it is, that the dealer is willing to sell Wagons at such a small margin of profit.

THE REMEDY.

I will tell you how to remedy that one thing. I understand your Board of Directors are going to get out a new price-list for 1907. I will say for my company—and I am satisfied the other Wagon manufacturers' representatives are ready to say the same for theirs—that I will furnish this Board of Directors our wholesale prices, and also the freight rate to Spokane or to any other point that they ask it for. Take that price for Wagons, figure the freight rate and add the same margin of profit on that as on anything else, and fix that as the price to be paid for the coming year. Some of you may say if I do that and make that price I fix a price higher than that of some one who is not a member of the association and he will get the business. He will not, for the Wagon representatives will get together and uphold you in this policy.

I believe that the most important thing you have to contend with is the price on Wagons. Everyone of my dealers, and every other dealer that I have talked with, tells me that they make less money on Wagons, and have more work in connection with them, than on anything else. That is not right, and I believe that this association should, by a resolution, instruct its directors that in getting up a new price-list to add the same margin of profit to Wagons as on anything else; and if you do that you will get that profit and will make more money and therefore will feel better when us "poor cusses" come around and try to sell you more goods.

So far as selling to blacksmiths is concerned, I for

one am willing to go on record and pledge myself not to sell to anyone except he is a legitimate implement dealer in any town. I do not think I have a contract on this territory with anyone except with a legitimate implement dealer. And I assure you that I will not have during the year 1907.

Credits.

Johnston D. Campbell, secretary of the Spokane Jobbers' Association, discussed the subject of credits in a paper, in part as follows:

None of you here present to-day have a more valuable asset, either on your shelves or in the bank, than your credit. Startling as it may seem, it is a fact nevertheless that over 90 per cent. of the business done in the United States is done on credit. During the year 1905 the manufacturers of the United States did a business of over \$13,000,000,000, upon an actual cash investment of \$500,000,000; 96 per cent. of all the business done by the manufacturers of the United States was done upon credit. Now that seems startling, and yet sit down some day with a pencil and figure up yourselves the amount of business you do on time—on credit—and the amount you do in cash, and see if it does not startle you. So I say

THE MOST VALUABLE ASSET

you have in your business to-day is your credit; an asset which should be most carefully taken care of; an asset which should be nurtured and not abused. I think also that I can say without fear of contradiction there is no asset you have which is more often abused than that of credit. Not perhaps your own, but the man who buys from you. Because you sell on credit, you must do business on credit. If you do not take care of the credits that are due you, sooner or later you are going to have trouble with those you owe. At least 50 per cent. of the failures reported in one year can be traced directly to bad credits. Now I want to give you just

AN ILLUSTRATION.

Just about a month ago we had occasion to close an unfortunate debtor and take over his business. We hope and believe that we will pay out that business—pay out the debts—and still have several thousand dollars to turn back to the debtor. But in going over his books I found this was the cause of his failure: He had started in business about three years before with an invested capital of \$4000. That was all the cash he had. He has on his books to-day over \$7500, nearly double the amount of his invested capital, standing out on his books. In going over his business for the month of November we found his cash business amounted to \$1200 and his credit business \$1500. He had collected on his old accounts during the month of November \$800. So for the month of November he was \$500 behind on his credit business. And I said to him, "How soon can you get in the \$1300 of credit in the month of November?" He says, "I cannot hope to get in a dollar of that until next fall." Now just think of that! How could that man expect to do business and succeed in that manner? He had some notes, it is true, but he had not tried to collect them, and the great majority of his accounts were standing there without drawing any interest and without anything coming from them.

THE RETAILER'S FAULT.

Now I believe that a farmer, or other persons buying goods of you, has no more right to ask you to carry him for a year without interest and without security than you have to go to your home bank and ask them to advance you money to pay your bills without interest and without security. And I believe the credit system that has been worked up in this Inland Empire is largely the fault of the retailer. I know the farmers can be educated to pay their debts promptly, just as well as any one else. The strange thing to me is that some of the largest accounts on your books are of men who are absolutely good, who can go to the bank and give their note and get the money and pay you? But you have not asked them to do that for fear they will get mad and leave you and go to that man across the street and buy his goods. Isn't that a fact? But I want to say if this association will pass a hard and fast rule that any man who comes to you for credit should be required to give his note, bearing the legal rate of interest which you have to give at the bank, and make that a bankable note, it would be only a little while until the whole credit system of the Inland Empire would be changed, and changed for the better, so you could meet your bills promptly and discount them if you pleased by taking the farmers' note to the bank and getting the money.

I have gone over the books of various retailers at

various times to find out their condition, and it is astonishing to see the amount of money standing on the books not drawing interest, while you merchants are having interest added up on your past due accounts for them. It is only a question of time when those principles carried out as they have been in the past, are going to involve all of you if you do a credit business. You cannot help it.

MERCHANTS SHOULD GET TOGETHER.

It has been in the past a fact without doubt that if you crowded some of your collections some of your good farmers or neighbors in town, would get huffed and go across the street to buy. But if you all combined and made the same rule when such people go across the street the man over there will hold up a stiff upper lip, and say: "I do not want to sell you on any different terms than Tom Jones would across the street." You would then find out he would be mighty glad to give you his note and pay



R. L. SPIKER.

his bills when they become due. The very system of credit is a matter of education. It is so in all lines of business.

The credit system is more prevalent in the farming districts than in the cities, because the large stores in the cities do practically a cash business. But you who have to carry your neighbor from one year's end to another have to do the credit system; but there is no reason why you cannot inaugurate the system that if you carry a man he must give you good, bankable paper, and

that you carry him in that manner.

I believe the wholesaler and retailer should work together to this end. I believe it would be a kindness to the retailers if the wholesalers always insisted on bills being met when due according to the terms of sale. If that was done you would push the man owing you, and he would settle up so you could pay.

What you want is co-operation in this matter; and you must show people dealing with you that you must have your money; that you have your bills to pay, and that if you must carry them to the next fall, you must get a bankable paper so that you can take it to the bank and get your discounts, instead of paying 8 per cent. on your past due accounts.

Other Addresses.

G. H. Batrick, Battle Creek, Mich., read a paper on the subject, "Side Lights on Selling Threshing Machines," and Thomas H. Brewer, vice-president of the Fidelity-National Bank of Spokane, discussed "The Merchant as a Banker," being a reply to a paper read by J. M. Nankervis at the last annual meeting of the association. There was also a general discussion of the question, "Does a Threshing Machine Agency Pay?"

New Officers.

The following officers and directors were elected for the ensuing year:

PRESIDENT, R. L. Spiker, Lewiston, Idaho.
FIRST VICE-PRESIDENT, A. Urbahn, Spokane, Wash.
SECOND VICE-PRESIDENT, A. B. Salmon, Wilbur, Wash.
SECRETARY-TREASURER, E. W. Evenson, Box 1062, Spokane, Wash.

DIRECTORS, for three years: John Smith, John Smith Company, Walla Walla, Wash.; J. H. Berge, Davenport, Wash.; E. E. Plough, Plough Hardware Company, Wilbur, Wash.; John Raymer, Reardon, Wash.; I. C. Hattabaugh, Grangeville Implement Company, Grangeville, Idaho; A. Z. Wells, Wells & Morris, Wenatchee, Wash.; F. J. Guth, Odessa Hardware & Implement Company, Odessa, Wash.

For one year: G. J. Tompkins, Tompkins & Co., Republic, Wash.

Mutual Fire Insurance.

One of the sessions of the convention was devoted to the affairs of the Washington Hardware & Implement Dealers' Mutual Fire Insurance Company, which is conducted under the auspices of the Inland Empire Association. W. P. Lucas, president of the company, made an

address, from which we give the following extracts, which indicate that the company has made a very creditable showing during its first year of business:

This matter of mutual fire insurance is of the utmost importance to us all and should have our most careful study and attention. It is a matter which means a saving of money to us all, the dividends going to those who patronize us rather than to high salaried officers and stockholders, as is the case in old-line insurance. We are nearing the close of our first year's business, and we have made a most favorable showing. We have met with many obstacles, but thus far we have handled them without making any great or expensive mistakes. We are able to come before you at this time and tell you what we have done, as well as what we expect to do during the coming year.

OUR RECORDS SHOW

that the receipts of the past year have been used as follows: Expense of organizing and operating the company to date, 15 per cent.; loss ratio, 26½ per cent.; reinsurance, 16 per cent.; passed to reserve fund, 10 per cent.; return premiums, 25 per cent.; on hand for current expenses, 7½ per cent.

As our receipts grow larger the expense ratio will grow less, and we can safely promise you better results for the coming year. As we grow larger and stronger we can carry a larger line of insurance and thereby reduce the amount paid for reinsurance. We hope to be able to make arrangements for an exchange of reinsurance with other companies of this nature, and in this manner it will help us grow to the extent that we can with safety carry the full \$3000 risks, as provided in our by-laws. At the present time we can with safety carry but \$1000 on each risk, and all amounts of policies above that amount are covered by reinsurance. We will be able to carry \$2000 on a single risk after we have a line of \$750,000 in force, but before we can reach that amount it will be necessary for us to secure \$325,000 of new business, which I feel confident we can secure before our June meeting.

WE HAVE REACHED A POINT

where we can afford to go out after business and feel that the money so expended will be well spent, as it is like all other good things, once a member gets a taste of it he likes it, and he is with us for keeps and we will be certain of his renewal of policies as he needs the insurance. We have made arrangements whereby we can write each member for the full amount of their insurance regardless of whether the risk is for \$1000 or \$10,000.

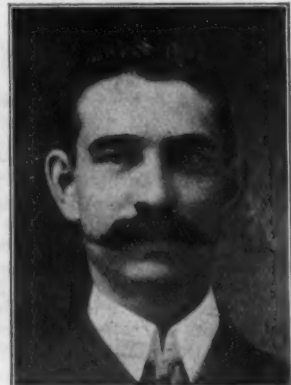
At the present time if we were to write a risk for \$10,000 we would immediately reinsure \$9000 of it, dividing that amount among the different companies of this kind with which we reinsure and the remaining \$1000 we would carry ourselves.

Our firm has decided that we will place every dollar of our insurance with this company, as we feel that it is the safest and cheapest insurance we can get.

The requirements of the insurance laws of some of



E. W. EVENSON.



E. E. LUCAS.

our neighboring States are such that it makes it next to impossible for a company of this kind to start, and we have only to go after their business and show them the advantages of doing business with us; thus giving us new business which will enable us to grow at a rate and make a showing equaled by no other company of this kind.

At the present time we have a line of \$428,850, of which we have \$273,050 at risk and the balance of \$155,800 is reinsured in four different companies writing reinsurance for us.

Insurance Officers.

The following persons were chosen as officers of the insurance company for the year to come: President, W. P. Lucas, Davenport, Wash.; vice-president, C. A. Loy, Fairfield, Wash.; Treasurer, E. L. Scott, Oakesdale, Wash.; secretary, E. W. Evenson, Spokane, Wash.

It was determined to pay a return premium of 25 per cent. on all policies expiring during 1907.

Banquet and Smoker.

The gathering was brought to a close with a very enjoyable banquet and smoker arranged by E. F. Waggoner, J. A. Fridaker, A. Urbahn and E. W. Evenson. The Elks' Quartette furnished the music. Mr. Waggoner presided efficiently as toastmaster, the list of toasts being as follows: "Our Wives and Sweethearts," E. W. Evenson, Spokane; "The Association," J. N. Nankervis, Moscow; "Goodfellowship," F. W. Dewart, Spokane; "The Commercial Traveler," J. H. Abrams, Spokane; "The Merchant," G. J. Tomkins, Republic; "The Manufacturer," E. M. Brannock, Portland, Ore.; "Our Empire," N. W. Durham, Spokane; "Opportunities," E. E. Lucas, Davenport; "Responsibilities," I. C. Hattabaugh, Grangeville; "Concentrated Efforts," F. E. Goodall, Spokane; "Our Country," Rev. W. J. Hindley, Spokane; "Spokane," H. W. Allen.

REQUESTS FOR CATALOGUES, Etc.

The trade is given an opportunity in this column to request from manufacturers price-lists, catalogues, quotations, &c., relating to general lines of goods.

REQUESTS for catalogues, price-lists, quotations, &c., have been received from the following houses, with whom manufacturers may desire to communicate:

FROM **FILLMORE HARDWARE COMPANY**, Fillmore, N. Y., which succeeds Charles Ricker, and will continue business at the old stand, handling Hardware and allied lines and making a specialty of plumbing and heating.

FROM **A. VERECKE**, who has recently opened a Hardware, House Furnishing Goods and Electrical and Gas Lighting Supply store at 716 Amsterdam avenue, New York City.

FROM **CENTRAL HARDWARE COMPANY**, Portsmouth, Ohio, whose collection of catalogues and price-lists has just been destroyed by a disastrous flood.

FROM **A. J. WIECHARDT**, Cleveland, Ohio, consulting mechanical engineer, who is in the market for Horse and Mule Shoe Machinery and Horse Nail Machines.

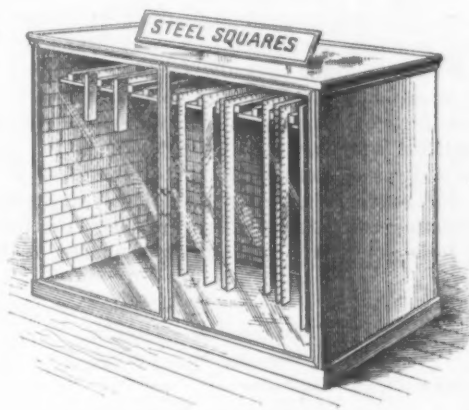
FROM **COLE HARDWARE COMPANY**, Berkeley, Cal., which has recently purchased the stock and business of C. H. G. Runde.

WILLIAM HENRY TAPPAN, who died at Manchester, Mass., recently, was a pioneer Western Hardware merchant. He established a Hardware business at Denver, Colo., in 1856, and later one at Central City, which he conducted until it was destroyed by fire in 1874. He was born in Manchester 85 years ago, and went West in 1848 on a mission for the national Government, to establish military posts in Montana, Idaho, Oregon and Washington Territory. He settled in Washington Territory, where he was prominent in the establishment of the Government, serving as a member of the first Legislature for four years. For a time he conducted a supply house for the Pacific Mail steamships at St. Helena, and later operated a cattle ranch. Then he went into the Hardware business. Returning to Manchester after the fire which had destroyed his property he practiced civil engineering as long as his health permitted. He had represented his town in the Massachusetts House and Senate.

THE MOXHAM HARDWARE COMPANY, Johnstown, Pa., has been granted a Pennsylvania charter, with \$12,000 capital. Charles Leventry is treasurer.

A CASE FOR SQUARES.

THE adaptation of an unused upright show case for holding and displaying Iron and Steel Squares is shown in the accompanying cut. The main point of interest in this arrangement lies in the economic space in which these usually somewhat troublesome articles are kept and displayed. The case is 32 in. wide, 29 in. high and 12 in. deep, and stands on the floor at the end of a counter. The top of the case is glass, while the sides and back are solid wood. The front of the case is com-



A Case for Squares.

posed of double glass doors, closing against each other, and held shut by a catch. A shelf 8½ in. wide extends the width of the case, 23 in. from the bottom. The top of the shelf is divided into 1½ in. spaces by wooden strips, ¾ in. high, and in these spaces Squares are hung by the tongues, one number or style to a space. The wooden portions of the interior of the case, including the shelf, are covered with paper in imitation of small white tiles. Conveniently placed above the shelf and 9 in. from the front of the case is a wooden strip 1½ in. wide, not shown in the cut, extending the width of the case, upon which the numbers and prices of the Squares are marked, the markings being immediately above the Squares to which they refer. This plan of handling Squares has been found very convenient in the store of the F. T. Witte Hardware Company, 106 Chambers street, New York.

PETER A. FRASSE & Co., 92-94 Fulton street, New York, who a few months ago purchased various portions of the business identified with the manufacture of Stephens and Snediker Rapid Transit Vises and the Snediker Leg Vise and began the manufacture of these goods, together with a line of Bull Dog pattern Vises, announce that they have sold their entire manufacturing plant of these goods to G. M. Yost Company, Mechanicsburg, Pa. The latter company will continue the production of these kinds of Vises, and Peter A. Frasse & Co. will act as jobbers of its line in this locality.

H. R. FEHLAND, president of H. R. Fehland Hardware Company, Merrill, Wis., died January 14. Mr. Fehland was well known throughout northern Wisconsin, having served at one time as a representative from Lincoln County in the State Legislature, besides having held other positions of trust.

THE FRASER MERCANTILE COMPANY, Freeport, Ill., has acquired control of the Acme Mfg. Company, manufacturer of Hardware Specialties and Sheet Metal Work. The Fraser Mercantile Company will also operate a retail Hardware store, which is now being fitted up and will be ready for operation about February 1.

LOWE BROTHERS COMPANY, Dayton, Ohio, has devoted the January number of its house organ, "The Little Blue Flag," to its annual convention of salesmen. Special attention is given to advertising supplies and to the publicity campaign planned for the ensuing year.

FACTORY COST AND BUSINESS METHODS.

COST SYSTEM OF A TECHNICAL SCHOOL.

THE Washburn Shops of the Worcester Polytechnic Institute, Worcester, Mass., have worked out and put into successful operation a simple system of getting labor costs and keeping track of orders in process in the works. The system has several original features and suggests application to other manufacturing establishments. The Washburn Shops differ radically from the ordinary manufacturing establishment in that their primary function is the training of students taking courses in mechanical and electrical engineering. But aside from the student practice a corps of journeymen and apprentices is maintained, and several lines of machine tools are manufactured, together with certain other products. The line may be said to be somewhat complex, as compared to that of

THE WASHBURN SHOPS.
Worcester, Mass., *Oct 6* 1906

To Foreman of *Machine* Department.
Make for *The Washburn Shops*
Their order No. _____

50 - 14 "Sensitive Drills and Shafts"

1	1874	16 - 1873	31 - 1703	46 - 1729
2	1876	17 - 1877	32 - 1904	47
3	"	18 - 1893	33 - 1913	48
4	"	19	34	49
5	"	20	35 - 1926	50 - 1932
6	"	21	36	"
7	"	22	37 - 1929	"
8	"	23	38	"
9	"	24	39	"
10	"	25	40	"
11	"	26	41	"
12	"	27	42	"
13	"	28	43	"
14	1898	29	44	"
15	1877	30	45	"

Wanted _____ 190
Deliver Via _____
Day Book Page _____
L. W. Rawson Supt.
Shop Order No 149

Fig. 1.—Example of Shop Order, Size 6 x 8½ In.

most machine tool establishments. The management considered the matter of a cost system with some deliberation, giving much attention to the subject in the effort to secure a method of keeping track of costs which would be effective and at the same time simple and economical. The result has been very satisfactory, all requirements being fulfilled.

Use of Duplicate Shop Orders.

To carry the working of the system through in the sequence of its operations, when a lot of machines is to be built a shop order is made out in carbon duplicate as shown in Figs. 1 and 2. It will be noted that Fig. 2 contains very much less information than Fig. 1. The former, printed in red, is for the information of the shop foreman alone. The latter, in black lettering, serves other purposes in the office records, for it answers as a part of the record of the machines in the lot, each being numbered, so that if in the future information is desired as to any particular machine this shop order sheet, together with the book record showing to whom the machine was sold, is of invaluable assistance.

With the shop order, Fig. 2, goes a tag, Fig. 3, for each part of the machine. The tag must stay with its part until completed and is checked to indicate the shop operations required in manufacturing that part. This is

THE WASHBURN SHOPS.
Worcester, Mass., *Oct 6* 1906

To Foreman of *Machine* Department.
Make for *The Washburn Shops*
Their order No. _____

50 - 14 "Sensitive Drills and Shafts"

Wanted _____ 190
Deliver Via _____
Fill out material used upon opposite side.
Return order at once on completion of work.
L. W. Rawson Supt.
Shop Order No 149

Fig. 2.—Carbon Duplicate of Shop Order, Same Size as Original, Fig. 1.

provided for by printing on each tag all the operations possible in the shop work, which are numbered.

Workmen's Time Cards.

Every workman has a day card holder, shown in Fig. 4. It is backed with stiff leather board. The heavy buff colored paper front forms a pocket with the back into which slips the day card, Fig. 5. The holder has the list of operations, together with "total hours" and "No. of pieces," corresponding with the part tag. The day card contains the same numbers in a vertical row. When the day card is in its holder, as shown in Fig. 6, the spaces

ORDER NUMBER 149

PART No. *B-7*
NO. of PIECES *50*

OPERATIONS REQUIRED ARE CHECKED.

1. Center.	10. Fit and Bore.
2. Square and Turn.	11. Assemble.
3. Check and Bore.	12. Paint.
4. Plane.	13. Forge.
5. Drill and Tap.	14. Babbitt.
6. Mill.	15. Shipping.
7. Grind.	16. Miscellaneous.
8. Bore.	17. Total Hours.
9. File and Polish.	18. No of Pieces.

THE WASHBURN SHOPS.

Fig. 3.—Example of Tag Accompanying Each Part.

against its numbers come opposite corresponding numbers and operations on the holder. The holders are generally shellacked, rendering them much more durable than they would otherwise be. They are merely indexes, nothing being written upon them.

Cards Divided into Strips.

The day card itself is rather a novelty. It consists of a marginal space and three vertical strips, perforated

so that they can be torn apart easily. Each strip represents work on some one part. If a workman should have more than three parts assigned to him in the course of a day he would have to take out another day card and hand it in with the other. This seldom happens, of course, but it makes no difference if it does.

The workman enters the order number, part number and letter and his own number on the strip, and when

ORDER No.	
PART No.	
WORKMAN No.	
1. Center.	
2. Square and Turn	
3. Chuck and Ream.	
4. Plane.	
5. Drill and Tap.	
6. Mill.	
7. Grind.	
8. Bore.	
9. File and Polish.	
10. Fit and Scrape.	
11. Assemble.	
12. Paint.	
13. Forge.	
14. Babbit.	
15. Shipping.	
16. Miscellaneous.	
17. Total Hours.	
18. No. of Pieces.	

Fig. 4.—Workman's Day Card Holder, Size 4½ x 5½ In.

he has completed his work on the part he enters on the strip against the operation number the number of hours spent upon it. Or it may be that he performs several operations on the same part, in which case he puts down the time of each on the one strip. If the entire day is

ORDER NO.	431	110	149
PART NO.	P8	✓	B7
WORKMAN NO.	28	28	28
1.	1	1	1 ½
2.	1	2	2
3.	3	3	3
4.	4	4	4
5.	5	5	5
6.	6	6	6
7.	7	7	7
8.	8	8	8
9.	9	9	9
10.	10	10	10
11.	11	11	11
12.	12	12	12
13.	13	13	13
14.	14	14	14
15.	15	15	15
16.	16	2 ½	16
17.	1	17	2 ½ 17 6 ½
18.	12	18	✓ 18 50

NAME John Hurley
Check No. 28
Oct. 10, 1906
TOTAL HOURS 10

Fig. 5.—Workman's Daily Time Card.

used up on a single operation the day's time is put against the operation. If the entire day is given to one part but several operations, the one strip contains the total time.

The workman must write in his name, the date, his check number and the total day's work in hours on the marginal blank reserved for the purpose, which is hidden

in the pocket of the holder. He must also enter the number of the pieces completed, so that any loss by defective material or workmanship may be noted.

Practical Use of the Cards.

In the illustration John Hurley, No. 28, worked 1 hr. doing a job of squaring and turning on part P8 of order 431; 2½ hr. on a miscellaneous job on order 110, and finished out his day with 6½ hr. centering, squaring and turning part B7 of order 149, giving him a total of 10 hr. The sum of the footings of the several strips of his card gives him his total day's work. The card is turned in to the foreman at the end of the day, and the next day the workman takes a new card.

The foreman goes over the cards each day to see that the men have filled them out correctly and that the totals agree in hours of labor, and then takes them to the office, where they are placed in a cabinet drawer having a tab-

ORDER No.			
PART No.			
WORKMAN No.			
1. Center.	1	1	1 ½
2. Square and Turn	2	2	2 2
3. Chuck and Ream.	3	3	3
4. Plane.	4	4	4
5. Drill and Tap.	5	5	5
6. Mill.	6	6	6
7. Grind.	7	7	7
8. Bore.	8	8	8
9. File and Polish.	9	9	9
10. Fit and Scrape.	10	10	10
11. Assemble.	11	11	11
12. Paint.	12	12	12
13. Forge.	13	13	13
14. Babbit.	14	14	14
15. Shipping.	15	15	15
16. Miscellaneous.	16	16	2 ½ 16
17. Total Hours.	17	17	2 ½ 17 6 ½
18. No. of Pieces.	18	18	✓ 18 50

Fig. 6.—Time Card Inserted in Holder.

card for each workman, with his number on the tab. There the day cards remain until pay day, when they are used in making up the payroll. Knowing the hourly wage paid each man it is an easy matter to prepare the totals of his week's work in dollars and cents. The daily time cards then go to the record of costs.

Special Cabinets for Record of Costs.

Special cabinets are used in this system, shown in Fig. 7. They are divided into a large number of pockets, wide enough to take easily the strips of the time cards. Where a machine has a large number of parts a cabinet is devoted to it. Where the number of parts is small the records of two or more machines may be kept in one cabinet.

Each part has its own pocket, and pockets are numbered to correspond. When the payroll has been completed the time cards are stripped and the strips are distributed each to its pocket in the cabinet. The machine completed, the record of labor cost of each part is available, and also the record of each operation. The totals per part and per operation are obtained from the strips and transferred to the tab card, Fig. 8. This card contains the date of the shop order sheet, when the manufacture of the lot was begun and the date of completion, dates being expressed in numerals for months. Against each operation at the top of the square is the number of the workman who did the job, or perhaps more than one workman, and the time required is below.

25-Cent Hour Basis.

This brings us to an interesting feature of the system, the reduction of the time taken on each operation to the basis of a 25-cent hour. No matter what wage a man is paid his time appears on the tab card in hours, for which 25 cents was paid. For illustration, let us suppose that an apprentice boy who is paid 10 cents an hour performs

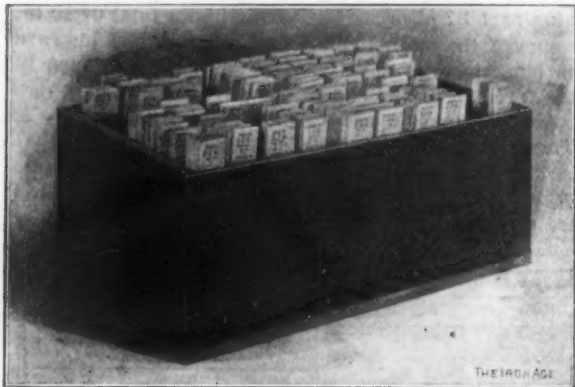


Fig. 7.—Cabinet with Pockets to Contain Strips from Time Card.

an operation on a part in 20 hr. He would cost the shop \$2 in wages. The \$2 is divided by 25 to get the number of hours on the 25-cent basis, which in this case would be 8. It is not taken into account at all that the apprentice worked 20 hr., excepting in the payroll. In the record of costs it is presumed that he worked 8 hr. at 25 cents an hour. The next time an order for the same machine goes through the shop a workman who is actually paid 25 cents an hour does the same work in 10 hr. His time is actually on the 25-cent basis, so that it need not be converted. In other words, 10 hr. is entered against him on the tab card. To take a more complex illustration we will presume that an operation of turning

MATERIAL	Cast Iron					WT.
LOT No.	145	146	147	148	149	
Date	3-6	5-7	6-28	6-13	8-23	
Cutting off	5-16	6-11	7-9	8-13	9-23	
Forging						
Centering	18	28	27	28	25	
Drilling and Turning	9	5	6.3	5	4.2	
Chucking and Reaming	32	31	38.1	35.3	33.5	
Planing						
Drilling and Tapping						
Milling						
Grinding						
Boring						
Filing and Polishing						
Priming	13	43	23	43	43	
Fitting and Scraping	3	1.4	1.5	1.4	1.4	
Assembling						
Total	51	44.4	45.7	57.4	49.4	

Fig. 8.—Tab Card, Giving Totals of Labor Cost and Records of Each Operation.

on one part of an order required the services of two men. One worked 10 hr. at 20 cents an hour, the other 10 hr. at 28 cents an hour. The total wage paid one was \$2, that of the other \$2.80. The combined wage cost was \$4.80. To secure the 25-cent basis the \$4.80 is divided by 25, giving a total of 19.2 hr. Any other arbitrary hourly basis could be used, but 25 cents is chosen because of the ease of reduction to that basis, and of conversion from hours to dollars.

The result in this system is the same as if instead of

hours on the tab cards the labor was given as dollars and cents, since all that is necessary to secure the cost in dollars is to divide the number of hours by 4, which is equivalent to multiplying it by 25 cents. The total cost of the machine is easily obtained by totaling the number of hours of all the cards and converting into dollars. This may be carried on a general tab card.

System of Numbering.

A word should be given to the system of numbering orders and parts. The order number has its significance. The first numeral of the number indicates the type of machine, the second numeral the size and the final numeral the lot. Thus the order number 149 used on the order sheet indicates a drill, No. 4 in size, and lot No. 9. In the course of time it may be necessary to duplicate order numbers, as only nine orders are possible for one type and size of machine. But the lots are made large enough, proportionate to the demand for the machine, to carry over a year or two before duplication can be necessary, and two lots of the same number so far apart cannot cause confusion, especially as each individual machine has its own number, regardless of lot. Each type and size of machine also has its own letter used in designating patterns. Thus B7 means a No. 4 drill of particular type, the seven indicating the number of part.

AUSTRALIAN NOTES.

FROM A SPECIAL CORRESPONDENT.

WITH the advent of the Christmas season retail ironmongers are naturally feeling the benefit of increased sales. Taking the Hardware trade as a whole, the outlook is a distinctly good one. The harvest, however, will be a late one this year, consequently the money resulting from it will not be in circulation quite so early as usual. Harvesting requisites have been in great demand and implement makers generally are kept well employed. The strike in the building trade in Melbourne still continues and the industry for the time being is absolutely paralyzed. There are hopes—but only hopes—of the settlement of the strike during the ensuing week. The effect on other trades of course is easily imaginable.

The New Zealand Exhibition at Christchurch is now in full swing and continues to be well patronized. Steamers from Australia are taking over large numbers of visitors and the exhibition should have a good effect on local trade. The colony of New Zealand has had a long succession of good seasons and it is to be hoped that the good seasons will continue, for this little colony carries one of the largest debts per head in this part of the world.

The building trade in New South Wales, South Australia, and Tasmania, is reported to be in a very satisfactory state and showing great activity. Railroad material and supplies are in steady demand in the various states and railroad extension is being pushed forward, especially in New South Wales. The gold returns of the various states are keeping well up and many new copper mines are being put on the market.

AMERICAN HAND SAWS IN SCOTLAND.

ACCORDING to Consul Rufus Fleming of Edinburgh, Scottish carpenters, joiners and cabinet makers have long shown a decided preference for American Hand Saws. In a recent communication to the Government he writes:

An Edinburgh Saw expert informs me that these tools have now gained such a reputation that they have the first grade market practically to themselves. Probably over 75 per cent. of the Hand Saws now sold to skilled mechanics in this district are American. English Saw makers have closely copied standard American Saws so far as appearance goes, but my informant asserts that they have entirely failed to imitate the American quality.

An Edinburgh Saw dealer tells me that he gets 10 per cent. more discount on the best Sheffield Saws than on American Saws, but that he finds it more profitable to handle the American goods, owing to the strong preference for them.

Speaking generally, I may mention that only the best wares are good enough for the Scottish market, and that this rule applies with especial force to tools of every description. As yet, American carpentering Saws other than Hand Saws are little sold in this district. I may mention that Swedish Hand Saws and French Circular Saws are sold in this market, and that German Meat Saws have a considerable sale here.

MISCELLANEOUS NOTES.

Buffalo Down Draft Forge No. 660.

Buffalo Forge Company, Buffalo, N. Y., has improved its No. 660 blacksmiths' down draft forge by substituting terra cotta pipe, for the first section of the smoke stack, in place of sheet iron. This is set on a cast iron hood. The forge is fitted with a No. 200 Buffalo blower and special cast iron tuyere with clincker gate. In operation the turning of the crank of the blower draws all smoke and gases from the fire into the exhaust hood by means of the draft produced by a connection to the fan case. The larger portion of the gases escape up the stack because of the natural and induced draft, while a part is returned to the tuyere through the fan. A separate connection, direct from the blast pipe into the stack, strengthens the natural draft and is used when the fire is being started. The maker claims that with the use of this forge there are no smoky shops, that there is nothing about the forge to wear out and that it will last a lifetime.

Tufted Chair Seats and Porch Cushions.

W. A. Busse & Co., 36-38 Union Park Court, Chicago, Ill., for whom H. Berkele, 43 Leonard street, New York, is representative here and in adjacent metropolitan territory, have added to their line of patented upholstered adjustable chair seats the styles here illustrated, the peculiarity of which is in the fact that they are intended



Fig. 1.—Leader Pattern Tufted Chair Seat.

to be nailed permanently to the chair and sold for a low price. Fig. 1, the Leader tufted seat, is covered with a good quality of artificial leather, padded with cotton felt, mounted on strong three-ply 3-20-in. veneer and tufted with pronged japanned rivets, which will not pull out. This seat is also made plain, without tufts. The series are 12, 14, 15 and 16 in. in black or maroon material. Japanned metaline nails sufficient for each seat are sent with it. Fig. 2 represents the Vienna style, which is identical with the Leader pattern except in shape, the sizes being 12, 13, 14, 15 and 16 in. diameters and the colors maroon or black. Fig. 3 is a crown pattern rocker cushion designed for rockers, office chairs, &c. It is made

in 15 and 17 in. sizes in black only, in both artificial leather and enamel cloth. The filling is a cotton and jute felt, soft and pliable, and about $\frac{7}{8}$ in. from top to bottom.

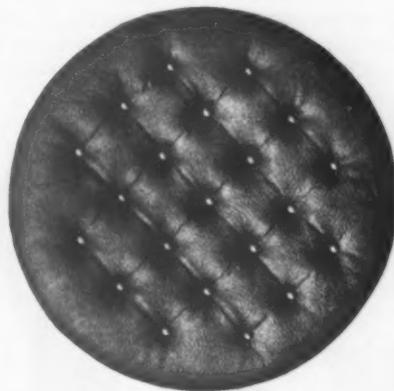


Fig. 2.—Vienna Tufted Seat.

The edge is bound with art leather gimp. The materials are stitched to cardboard. A similar seat for porch, summer house, yacht and other like uses is made in a round



Fig. 3.—Rocker Cushion Seat.

pattern in 15 and 17 in. sizes. Neither of the last two seats are suitable for nailing over an open chair seat frame.

Concrete Cart No. 1.

Sterling Wheelbarrow Company, 238-246 Oregon street, Milwaukee, Wis., is offering the concrete cart shown herewith. The tray is made of 14 gauge steel, reinforced with angle iron entirely around the top edge, and has



Concrete Cart No. 1.

forged corners. The legs are of heavy steel. The wheels, 30 in. in diameter, are patent roller bearing, with $1\frac{1}{2}$ in. staggered spokes in tension and 2-in. tires. The hub bands are wrought, and the cart is provided with $1\frac{1}{4}$ in. bent axles. The tray has a capacity of $6\frac{1}{2}$ cu. ft. of thin, sloppy concrete, or $7\frac{1}{2}$ cu. ft. of dry material.

Richards Portable Seat Back.

The portable seat back shown in the accompanying cuts is made of Bessemer steel, finished in black gloss enamel. It is provided with two spring clamps which slip into place instantly and hold the seat securely on any board. The device affords a comfortable back for



Fig. 1.—Richards Portable Seat Back.

boat seats, wagon seats, benches, bleachers, or wherever a board seat is used, adapting it to use at baseball parks, summer resorts, circus exhibitions, chautauquas, &c. The seat back is alluded to as having a delightful supporting action, the spring effect being much more restful than a rigid back. The back folds compactly, Fig. 2,

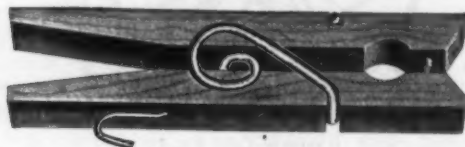


Fig. 2.—Richards Seat Back, Folded.

making it convenient to carry or to pack. It is 15 in. high, 13 in. wide, and 9½ in. deep, the shipping weight being 40 lb. to the dozen. The back is put on the market by Richards Mfg. Company, Aurora, Ill.

Veneer Manufacturers' Clip.

The Demeritt & Palmer Packing Company, Waterbury, Vt., is offering the veneer manufacturers' clip



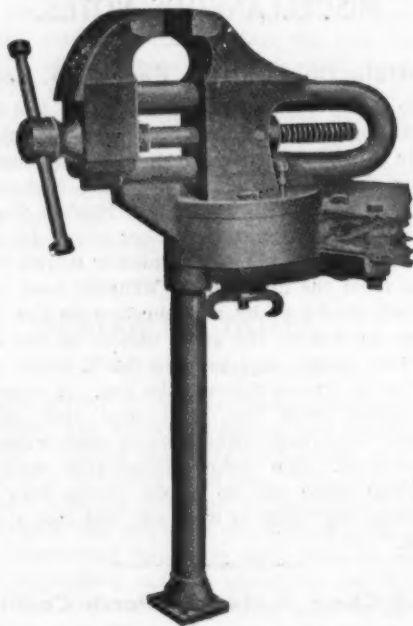
Veneer Manufacturers' Clip.

shown in the accompanying cut. It is designed for holding heavy materials in place while in the process of manufacture, being especially adapted to hold thin pieces of board in place while being glued together. The spring

in the clip is exceptionally strong, and the clip has a steel brad between the ends of the jaw, to give it great holding power. The wire hook is to permit the clip being hung on a line.

Ware's Steel Yoke Vise.

A new form of bench vise manufactured by J. L. Ware & Co., St. Paul, Minn., is shown in the accompanying illustration. This vise differs from the more ordinary form, known as the box vise, in that it is firmly joined together by a steel yoke, which is so arranged as to cause a minimum of interference with the jaw opening, and enables work to be inserted very near to the



Ware's Steel Yoke Vise.

center of the jaws. All of the mechanism is easily accessible for oiling and cleaning, and the yoke slides through a closely fitted hole, thus preventing injury thereto from the dropping of filings and dripping of oil. The vise is fitted with a new semiswivel base stand, by means of which, it is remarked, it may be lowered and brought into direct line of the work at any angle. Greater strength and durability as well as economical operation are the chief features claimed for the tool.

Covert's New Polo Snap No. 70.

Covert Mfg. Company, Troy, N. Y., is placing on the market the polo snap herewith illustrated. It is referred to as a unique departure from the usual line of



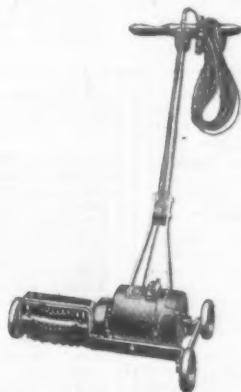
Covert's New Polo Snap No. 70.

snaps, strong in construction, having a guarded rust proof spring, serviceable and neat in appearance. It is made in all regular sizes.

The Leonard-Underwood Company, Janesville, Wis., has succeeded to the Lowell Hardware Company. The change is merely one of name, as the same interests will continue in control.

The Hutchison Electric Carpet Beater and Sweeper.

Hutchison Electric Carpet Sweeper Company, Arrott Power Building, Pittsburgh, Pa., is offering the electric carpet beater and sweeper shown herewith. The machine is readily attached to any electric light appliance, and can be operated by any ordinarily intelligent person. The beaters are metal balls attached to the brush journal by means of suitable link and spiral spring fastening. The balls strike the carpet 2000 times per minute, causing the dirt to loosen, when the brush places the dirt in the receptacle. The machine is operated with little labor, and



The Hutchison Electric Carpet Beater and Sweeper.

the expense for current is less than for that used by a 16 candle power lamp. The brush is formed by placing the bristles in spirally, and are the best Russian gray. As the brush wears down it can be lowered in a minute's time, and can thus be used for sweeping until the bristles are entirely worn out. New brush with beaters can be obtained at any time. The dirt receptacle on the cover rides independently of the frame, to make it easy of access for removing the dirt without lifting the machine or touching the dirt with the hands. The manufacturer claims that the machine will do its work in a comparatively limited time, that it beats and sweeps the carpet on the floor, that it does the work perfectly and without injury to the most delicate fabric, and that it allows no dust to arise. All parts of the machine can be duplicated at the factory.

Holt's Patent Interchangeable Brad Awl.

G. L. Holt, Hartford, Conn., is putting on the market the Interchangeable Brad Awl shown in Fig. 1. It comprises a hard ebonized wood handle with metal grip by means of which any one of the six accompanying blades may be pinned into the handle as shown in Fig. 2. The blades are made in six sizes from fine tool steel wire uni-



Fig. 1—Holt's Interchangeable Brad Awl.

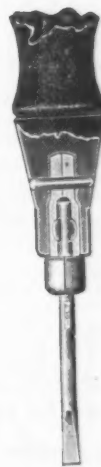


Fig. 2.—Sectional View of Grip.

formly tempered and finely finished. It is stated that the mechanism of the grip is such that it is impossible to turn the awl in the handle or pull the handle from the awl. If an awl is broken or another size is required it is only necessary to drive out the pin, pull the grips from the handle, insert a new blade and replace the pin as before. Extra blades are furnished at moderate expense, packed in partition boxes, each size by itself in quantities as desired. The size is stamped on every blade.

PAINTS, OILS AND COLORS

Animal, Fish and Vegetable Oils—

	gal	
Linseed, City, raw.....	41	@42
City, Boiled.....	43	@44
State and Western, raw.....	39	@40
Raw Calcutta, in bbls.....	40	@41
Lard, Extra Prime, Winter.....	76	@77
Extra No. 1.....	50	@51
No. 1.....	44	@46
Cotton-seed, Crude, f.o.b. mills.....	34	@40
Summer Yellow, Prime.....	48	@49
Summer White.....	45	@46
Yellow Winter.....	43	@44
Sperm, Crude.....	52	@53
Natural Winter.....	65	@66
Bleached Winter.....	68	@69
Bleached Winter, Extra.....	70	@72
Tallow, Prime.....	54	@55
Whale, Crude.....	35	@36
Natural Winter.....	45	@46
Bleached Winter.....	47	@48
Extra Bleached Winter.....	49	@50
Menhaden, Brown, Strained.....	29	@32
Light, Strained.....	29	@32
Northern.....	28	@29
Southern.....	27	@28
Cocconut, Ceylon.....	10	@11
Cochin.....	10	@11
Cod, Domestic, Prime.....	30	@35
Newfoundland.....	34	@42
Red, Elaine.....	45	@48
Saponified.....	10	@11
Olive, Italian, bbls, Yellow.....	65	@75
Neatsfoot, Prime.....	49	@50
Palm, Lagos.....	10	@11

Mineral Oils—

Black, 28 gravity, 25°30 cold test.....	11	@12
28 gravity, 15 cold test.....	12	@13
Summer.....	11	@12
Cylinder, light filtered.....	18	@19
Dark, filtered.....	16	@17
Paraffine, 90-907 gravity.....	14	@15
90 gravity.....	13	@14
85 gravity.....	10	@11
Red.....	13	@14

Miscellaneous—

Barytes:		
White, Foreign.....	100	@18.50@20.50
Amer. floated.....	100	@19.00@20.00
Off color.....	100	@13.00@16.50
Chalk, in bulk.....	100	@3.00@3.25
In bbls.....	100	@3.00@3.25
China Clay, English.....	100	@11.00@17.50
Cobalt, Oxide.....	100	@2.50@2.80
Whiting, Commercial.....	100	@4.50@5.00
Gilders.....	100	@5.00@5.50
Ex. Gilders.....	100	@6.00@6.50
Putty, Commercial—	100	@1.00
In bladders.....	100	@1.70@1.85
In bbls, or tubs.....	100	@1.20@1.45
In 1 lb to 5 lb cans.....	100	@2.00@2.50
In 12 1/2 to 50 lb cans.....	100	@1.50@1.90
Spirits Turpentine—	gal	
In Oil bbls.....	73	@73 3/4
In machine bbls.....	73	@74
Glue—		
Cabinet.....	12	@15
Common Bone.....	7	@9
Extra White.....	18	@24
Foot Stock, White.....	12	@14
Foot Stock, Brown.....	1	@11
German Hide.....	10	@18
Irish.....	13	@16
Low Grade.....	10	@12
Medium White.....	14	@17
Gum Shellac—		
Bleached Commercial.....	47	@48
Bones, Dried.....	57	@58
Button.....	40	@50
Diamond I.....	35	@55
Fine Orange.....	52	@55
A. C. Garnet.....	44	@45
Kala Button.....	37	@38
D. O.....	37	@38
Octagon B.....	40	@41
T. N.....	47	@48
V. S. O.....	46	@47
Colors in Oil—		
Black, Lampblack.....	12	@14
Blue, Chinese.....	36	@46
Blue, Prussian.....	22	@36

Blue, Ultramarine.....	13	@15
Brown, Vandyke.....	11	@14
Green, Chrome.....	12	@16
Green, Paris.....	12	@15
Sienna, Raw.....	12	@15
Sienna, Burnt.....	12	@15
Umber, Raw.....	11	@14
Umber, Burnt.....	11	@14

White Lead, Zinc, &c.—

Lead, American White:		
Lots of 500 lb or over, in Oil.....	7 1/2	@7 1/2
Lots less than 500 lb, in Oil.....	8	@8
Lead, English white, in Oil.....	9 1/2	@10
Lead, White, in oil, 25 lb tin		
pails, add to keg price.....	1/2	@1/2
Lead, White, in oil, 12 1/2 lb tin		
pails, add to keg price.....	1	@1
Lead, White, in oil, 1 to 5 lb		
ass'ted tins, add to keg price.....	1 1/4	@1 1/4
Lead, American, Terms: For lots 11		
tons and over 1/4¢ rebate; and 2% for		
cash if paid in 15 days from date of		
invoice; for lots of 500 lbs. and over		
2% for cash if paid in 15 days from		
date of invoice, for lots of less than		
500 lbs. net.....	5 1/2	@5 1/2
Zinc, American, dry.....	5 1/2	@5 1/2
Zinc, French:		
Antwerp, Red Seal, dry.....	5 1/2	@5 1/2
Paris, Red Seal, dry.....	5 1/2	@5 1/2
Paris, Green Seal, dry.....	11	@11
Zinc, V. M. French, in Poppy Oil:		
Green Seal:		
Lots of 1 ton and over.....	13 1/2	@13 1/2
Lots of less than 1 ton.....	15 1/2	@15 1/2
Zinc, V. M. French, in Poppy Oil:		
Red Seal:		
Lots of 1 ton and over.....	11 1/2	@11 1/2
Lots of less than 1 ton.....	12 1/2	@12 1/2
Discounts.—French Zinc.—Discounts		
to buyers of 10 bbl, lots of one or mixed		
grades, 1 1/2% 25 bbls, 2%; 50 bbls, 4%.		
Dry Colors—		
Black, Carbon.....	6 1/2	@10
Black Drop, American.....	4	@5
Black Drop, English.....	5	@15

Black, Ivory.....	16	@20
Lamp, Com.....	4	@6
Blue, Celestial.....	5	@6
Blue, Chinese.....	30	@33
Blue, Prussian.....	23	@32
Blue, Ultramarine.....	4 1/2	@15
Brown, Spanish.....	1/2	@1
Carmine, No. 40.....	3.10	@3.25
Green, Chrome, ordinary.....	3 1/2	@7
Green, Chrome, pure.....	17	@25
Lead, Red, bbls, 1/2 bbls, kegs.....	1/2	@7 1/2
Litharge, bbls, 1/2 bbls, kegs.....	1/2	@7 1/2
Ocher, American.....	10	@12
American Golden.....	2 1/2	@3 1/2
French.....	1 1/2	@2
Foreign Golden.....	3	@4
Orange Mineral, English.....	10	@12
French.....	10	@12
German.....	8 1/2	@10
American.....	8 1/2	@10
Red, Indian, English.....	4 1/2	@5
American.....	3	@3 1/2
Red, Turkey, English.....	1	@10
Red, Tuscan, English.....	1	@10
Red, Venetian, Amer.....	100	@1.25
English.....	100	@1.15@1.75
Sienna, Italian, Burnt and		
Powdered.....	3	@9 1/2
Italian, Raw, Powdered.....	3	@7
American, Raw, Powdered.....	1 1/2	@2
American, Burnt and Pow'd.....	1 1/2	@2
Talc, French.....	10	@17.00@25.00
American.....	10	@17.00@25.00
Terra Alba, French.....	100	@1.00
English.....	100	@1.00
American.....	100	@1.00
American.....	100	@1.00
Umber, Turkey, Bot. & Pow'd.....	2 1/2	@3 1/2
Turkey, Raw and Powdered.....	2 1/2	@3 1/2
Burnt, American.....	1 1/2	@2
Raw, American.....	1 1/2	@2
Yellow Chrome.....	12 1/2	@15
Vermilion, American Lead.....	10	@25
Quicksilver, bulk.....	5	@6
English, Imported.....	5	@6
Chinese.....	5	@6

Current Hardware Prices.

General Goods.—In the following quotations General Goods—that is, those which are made by more than one manufacturer—are printed in *Italics*, and the prices named, unless otherwise stated, represent those current in the market as obtainable by the fair retail Hardware trade, whether from manufacturers or jobbers. Very small orders and broken packages often command higher prices, while lower prices are frequently given to larger buyers.

Special Goods.—Quotations printed in the ordinary type (Roman) relate to goods of particular manufacturers, who are responsible for their correctness. They usually represent the prices to the small trade, lower prices being obtainable by the fair retail trade, from manufacturers or jobbers.

Range of Prices.—A range of prices is indicated by means of the symbol @. Thus 33½ @ 33½ & 10% signifies

that the price of the goods in question ranges from 33½ per cent. discount to 33½ and 10 per cent. discount.

Names of Manufacturers.—For the names and addresses of manufacturers see the advertising columns and also THE IRON AGE DIRECTORY, issued May, 1906, which gives a classified list of the products of our advertisers and thus serves as a DIRECTORY of the Iron, Hardware and Machinery trades.

Standard Lists.—A new edition of "Standard Hardware Lists" has been issued and contains the list prices of many leading goods.

Additions and Corrections.—The trade are requested to suggest any improvements with a view to rendering these quotations as correct and as useful as possible to Retail Hardware Merchants.

Adjusters, Blind—

Domestic, ½ doz. \$3.00.....33½%
North's.....10%
Zimmerman's—See Fasteners, Blind.

Window Stop—

Ives' Patent.....35%
Taplin's Perfection.....35%

Ammunition—See Caps, Cartridges, Shells, &c.

Anti-Rattlers—

Fernald Mfg. Co. Burton Anti-Rattlers, ½ doz. pairs, Nos. 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100, 101, 102, 103, 104, 105, 106, 107, 108, 109, 110, 111, 112, 113, 114, 115, 116, 117, 118, 119, 120, 121, 122, 123, 124, 125, 126, 127, 128, 129, 130, 131, 132, 133, 134, 135, 136, 137, 138, 139, 140, 141, 142, 143, 144, 145, 146, 147, 148, 149, 150, 151, 152, 153, 154, 155, 156, 157, 158, 159, 160, 161, 162, 163, 164, 165, 166, 167, 168, 169, 170, 171, 172, 173, 174, 175, 176, 177, 178, 179, 180, 181, 182, 183, 184, 185, 186, 187, 188, 189, 190, 191, 192, 193, 194, 195, 196, 197, 198, 199, 200, 201, 202, 203, 204, 205, 206, 207, 208, 209, 210, 211, 212, 213, 214, 215, 216, 217, 218, 219, 220, 221, 222, 223, 224, 225, 226, 227, 228, 229, 230, 231, 232, 233, 234, 235, 236, 237, 238, 239, 240, 241, 242, 243, 244, 245, 246, 247, 248, 249, 250, 251, 252, 253, 254, 255, 256, 257, 258, 259, 260, 261, 262, 263, 264, 265, 266, 267, 268, 269, 270, 271, 272, 273, 274, 275, 276, 277, 278, 279, 280, 281, 282, 283, 284, 285, 286, 287, 288, 289, 290, 291, 292, 293, 294, 295, 296, 297, 298, 299, 300, 301, 302, 303, 304, 305, 306, 307, 308, 309, 310, 311, 312, 313, 314, 315, 316, 317, 318, 319, 320, 321, 322, 323, 324, 325, 326, 327, 328, 329, 330, 331, 332, 333, 334, 335, 336, 337, 338, 339, 340, 341, 342, 343, 344, 345, 346, 347, 348, 349, 350, 351, 352, 353, 354, 355, 356, 357, 358, 359, 360, 361, 362, 363, 364, 365, 366, 367, 368, 369, 370, 371, 372, 373, 374, 375, 376, 377, 378, 379, 380, 381, 382, 383, 384, 385, 386, 387, 388, 389, 390, 391, 392, 393, 394, 395, 396, 397, 398, 399, 400, 401, 402, 403, 404, 405, 406, 407, 408, 409, 410, 411, 412, 413, 414, 415, 416, 417, 418, 419, 420, 421, 422, 423, 424, 425, 426, 427, 428, 429, 430, 431, 432, 433, 434, 435, 436, 437, 438, 439, 440, 441, 442, 443, 444, 445, 446, 447, 448, 449, 450, 451, 452, 453, 454, 455, 456, 457, 458, 459, 460, 461, 462, 463, 464, 465, 466, 467, 468, 469, 470, 471, 472, 473, 474, 475, 476, 477, 478, 479, 480, 481, 482, 483, 484, 485, 486, 487, 488, 489, 490, 491, 492, 493, 494, 495, 496, 497, 498, 499, 500, 501, 502, 503, 504, 505, 506, 507, 508, 509, 510, 511, 512, 513, 514, 515, 516, 517, 518, 519, 520, 521, 522, 523, 524, 525, 526, 527, 528, 529, 530, 531, 532, 533, 534, 535, 536, 537, 538, 539, 540, 541, 542, 543, 544, 545, 546, 547, 548, 549, 550, 551, 552, 553, 554, 555, 556, 557, 558, 559, 560, 561, 562, 563, 564, 565, 566, 567, 568, 569, 570, 571, 572, 573, 574, 575, 576, 577, 578, 579, 580, 581, 582, 583, 584, 585, 586, 587, 588, 589, 590, 591, 592, 593, 594, 595, 596, 597, 598, 599, 600, 601, 602, 603, 604, 605, 606, 607, 608, 609, 610, 611, 612, 613, 614, 615, 616, 617, 618, 619, 620, 621, 622, 623, 624, 625, 626, 627, 628, 629, 630, 631, 632, 633, 634, 635, 636, 637, 638, 639, 640, 641, 642, 643, 644, 645, 646, 647, 648, 649, 650, 651, 652, 653, 654, 655, 656, 657, 658, 659, 660, 661, 662, 663, 664, 665, 666, 667, 668, 669, 670, 671, 672, 673, 674, 675, 676, 677, 678, 679, 680, 681, 682, 683, 684, 685, 686, 687, 688, 689, 690, 691, 692, 693, 694, 695, 696, 697, 698, 699, 700, 701, 702, 703, 704, 705, 706, 707, 708, 709, 710, 711, 712, 713, 714, 715, 716, 717, 718, 719, 720, 721, 722, 723, 724, 725, 726, 727, 728, 729, 730, 731, 732, 733, 734, 735, 736, 737, 738, 739, 740, 741, 742, 743, 744, 745, 746, 747, 748, 749, 750, 751, 752, 753, 754, 755, 756, 757, 758, 759, 760, 761, 762, 763, 764, 765, 766, 767, 768, 769, 770, 771, 772, 773, 774, 775, 776, 777, 778, 779, 780, 781, 782, 783, 784, 785, 786, 787, 788, 789, 790, 791, 792, 793, 794, 795, 796, 797, 798, 799, 800, 801, 802, 803, 804, 805, 806, 807, 808, 809, 810, 811, 812, 813, 814, 815, 816, 817, 818, 819, 820, 821, 822, 823, 824, 825, 826, 827, 828, 829, 830, 831, 832, 833, 834, 835, 836, 837, 838, 839, 840, 841, 842, 843, 844, 845, 846, 847, 848, 849, 850, 851, 852, 853, 854, 855, 856, 857, 858, 859, 860, 861, 862, 863, 864, 865, 866, 867, 868, 869, 870, 871, 872, 873, 874, 875, 876, 877, 878, 879, 880, 881, 882, 883, 884, 885, 886, 887, 888, 889, 890, 891, 892, 893, 894, 895, 896, 897, 898, 899, 900, 901, 902, 903, 904, 905, 906, 907, 908, 909, 910, 911, 912, 913, 914, 915, 916, 917, 918, 919, 920, 921, 922, 923, 924, 925, 926, 927, 928, 929, 930, 931, 932, 933, 934, 935, 936, 937, 938, 939, 940, 941, 942, 943, 944, 945, 946, 947, 948, 949, 950, 951, 952, 953, 954, 955, 956, 957, 958, 959, 960, 961, 962, 963, 964, 965, 966, 967, 968, 969, 970, 971, 972, 973, 974, 975, 976, 977, 978, 979, 980, 981, 982, 983, 984, 985, 986, 987, 988, 989, 990, 991, 992, 993, 994, 995, 996, 997, 998, 999, 1000

Anvils—American—

Eagle Anvils.....½ lb. @ 85¢
Hay-Budden, Wrought.....½ lb. @ 95¢
Trenton.....½ lb. @ 95¢

Imported—

Peter Wright & Sons, ½ lb. 94 to 340 lb. 11¢; 350 to 600 lb. 11½¢
Anvil, Vise and Drill—
Millers Falls Co., \$18.00.....15-10%

Apple Parers—See Parers.

Aprons, Blacksmiths'—

Livingston Nail Co.....33½%

Augers and Bits—

Com. Double Spur.....70%
Jennings' Patn., reg. Finish.....60-50 @ 60-10%
Black Lip or Blued.....65 @ 65-5

Boring Mach. Augers—

Car Bits, 12-in. twist.....40-10%
Ford's Auger and Car Bits.....40-50%
Ft. Washington Auger Co., Concord's.....35%
Forster Pat. Auger Bits.....35%
C. E. Jennings & Co.:
No. 10 ext. lip, R. Jennings' list.....25%
No. 30, R. Jennings' list.....40-7½%
Russell Jennings'.....35-10-2½%
L'Hommedieu's Car Bits.....12%
Mayhew's Countersink Bits.....12%
Pugh's Black.....20%
Pugh's Jennings' Pattern.....20%
Snell's Auger Bits.....20%
Snell's Bell Hangers' Bits.....20%
Snell's Car Bits, 12-in. twist.....20%
Snell's King Auger Bits.....20%
Wright's Jennings' Bits.....20%

Bit Stock Drills—

See Drills, Twist.
Expansive Bits—
Clark's small, ½ lb.; large, 35.....50-10%
Clark's Pattern, No. 1 to 10.....40-7½%
No. 2, 118.....60-10-10%
Ford's, Clark's Pattern.....25%
C. E. Jennings & Co., Steer's Pat. 25%
Lavigne Pat., small size, 118, 90; large size, 350.....60-10-10%
Swan's.....60%

Gimlet Bits—

Common Dble. Cut.....\$3.00 @ 3.25
German Pattern, Nos. 1 to 10.....\$4.75; 11 to 13, \$5.75

Hollow Augers—

Bonney Pat., per doz. \$5.50 @ 6.00
Ames.....25-10%
Universal.....20%
Wood's Universal.....25%

Ship Augers and Bits—

Ship Augers.....40-10%
Ford's.....40-50%
C. E. Jennings & Co.:
Watrous'.....33½-10%
Snell's.....40%

Awl Hfts—See Handles, Mechanics' Tool.

Awls—

Brad Acls:
Handled.....gro. \$2.75 @ 3.00
Unhanded, Shlided.....gro. 63 @ 66¢
Unhanded, Patent.....gro. 66 @ 70¢

Peg Acls—

Unhanded, Patent.....gro. 31 @ 34¢
Unhanded, Shlided.....gro. 65 @ 70¢

Scratch Acls—

Handled, Com.....gro. \$5.50 @ 6.00
Handled, Socket.....gro. \$11.50 @ 12.00

Awl and Tool Sets—See Sets, Awl and Tool.

Axes—

Single Bit, base weights: Per doz.
First Quality.....\$1.75 @ 2.00
Second Quality.....\$1.25 @ 1.50
Double Bit, base weights:
First Quality.....\$7.00 @ 7.50
Second Quality.....\$6.50 @ 6.75

Axle Grease—

See Grease, Axle

Axles—

Concord, Loose Collar.....4½ @ 5¢
Concord, Solid Collar.....3½ @ 4¢
No. 1 Common, Loose.....3½ @ 4¢
No. 1½ Com., New Styles.....4½ @ 5¢
No. 2 Solid Collar.....3½ @ 4¢
Half Patent.....3½ @ 4¢

Nos. 7, 8, 11 and 12.....70 @ 75¢

Nos. 13 to 14.....70 @ 75¢
Nos. 15 to 18.....75 @ 75-50¢
Nos. 19 to 22.....75 @ 75-50¢

Boxes, Axle—

Common and Concord, not turned lb., 4½ @ 5¢
Common and Concord, turned lb., 5½ @ 6¢
Half Patent.....lb., 9½ @ 10¢

Bait—

Fishing—
Hendryx:
A Bait.....20%
B Bait.....25%
Competitor Bait.....20-50%

Balances—

Sash—
Caldwell new list.....50%
Pullman.....50-10 @ 60%

Spring—

Scale Balances.....50-10 @ 60%
Chatillon's:
Light Spg. Balances.....50-10%
Straight Balances.....40-50%
Circular Balances.....50-10%
Large Dial.....50-10%

Barb Wire—See Wire, Barb.

Bars—

Crow—
Steel Crowbars, 10 to 40 lb. per lb., 3 @ 3½¢

Towel—

No. 10 Ideal, Nickel Plate. ½ gro. \$8.50

Beams, Scale—

Scale Beams.....40%
Chatillon's No. 1.....40%
Chatillon's No. 2.....40%

Beaters, Carpet—

Holt-Lyon Co.:
No. 12 Wire Coppered ½ doz. \$0.80;
Tinned.....\$0.85
No. 11 Wire Coppered ½ doz. \$1.15;
Tinned.....\$1.20
No. 10 Wire Tinned.....½ doz. \$1.50
Western W. G. Co.:
No. 1 Electric.....½ gro. \$7.50
No. 2 Buffalo.....½ gro. \$9.00
No. 3 Perfection Dust.....½ gro. \$8.00

Egg—

Holt-Lyon Co.:
Holt, per doz., No. 5, Jap'd, \$0.80;
No. A, Jap'd, \$1.15; No. B, Jap'd, \$1.50; No. 6, Jap'd, \$1.65;
Lyon Jap'd, per doz., No. 2, \$1.35

Taplin Mfg. Co.: Improved Dover, per gro., No. 60, \$6.00; No. 75, \$6.50; No. 100, \$7.00; No. 102, Tin'd, \$6.50; No. 150, Hotel, \$15.00; No. 152, Hotel Tin'd, \$17.00; No. 200, Tumbler, \$25.00; No. 202, Tumbler Tin'd, \$29.50; No. 203, Mammoth, per doz., \$25.00

Turner & Seymour Mfg. Co.:
T. & S. Dover.....\$6.00
Western W. G. Co. ½ gro., Buffalo, No. 2, \$8.00; Perfection, No. 3, \$9.00
Wonder (R. M. Co.) ½ gro. net, \$6.25

Bellows—

Blacksmith, Standard List.....
Split Leather.....65%
Grain Leather.....80%

Hand—

Inch.....6 7 8 9 10
Doz.....\$5.50 6.15 6.80 7.15 7.70

Molders—

Inch.....9 10 11 12 14
Doz.....\$8.00 9.00 10.50 12.50 14.50

Bells—

Cow—
Ordinary Goods.....75-50 @ 75-10-5%
High grade.....70-10 @ 75%
Jersey.....75-10
Texas Star.....50%

Door—

Abbe's Gong.....45%
Barton Gong.....50%
Home, R. & E. Mfg. Co.'s.....55-10%
Trip Gong.....50-10 @ 50-10-5%
Yankee Gong.....35%

Hand—

Polished, Brass.....60 @ 60-5%
White Metal.....50 @ 50-10-5%
Nickel Plated.....80 @ 50-10%

Swiss.....50-10 @ 50-10-5%
Cone's Globe Hand Bells.....33½ @ 35%
Silver Chime.....33½ @ 35%

Miscellaneous—

Farm Bells.....lb., 2¼ @ 2½¢
Church and School.....60%
Table Call Bells.....50 @ 50-10%

Belting—

Leather—
Extra Heavy, Short Lap.....60-5%
Regular Short Lap.....60-10-5%
Standard.....70%
Light Standard.....70-5%
Cut Leather Lacing.....45%
Leather Lacing Sides, per sq. ft. 25¢

Rubber—

Agricultural (Low Grade).....75 @ 75-50%
Common Standard.....70 @ 70-10%
Standard.....60-50 @ 60-10%
Extra.....60-10 @ 60-5%
High Grade.....60-50 @ 60-10%

Bench Stops—

See Stops, Bench

Benders and Upsetters, Tire—

Detroit Perfected Tire Bender.....40%
Detroit Stoddard's Lightning Tire Upsetters, No. 1, \$4.25; No. 2, \$7.25; No. 3, \$10.50; No. 4, \$16.25; No. 5, \$20.50
Green River Tire Benders and Upsetters.....20%

Bicycle Goods—

John S. Lang's Son & Co.'s 1907 list:
Chain, Parts, Spokes.....50%
Tubes.....60%

Bits—

Auger, Gimlet, Bit Stock Drills, &c.—See Augers and Bits.

Blocks—

Tackle—
Common Wooden.....75%
Hartz St. Tackle Blocks.....50 @ 50-5%
B. & L. B. Co.:
Boston Wood Snatch, 50%; Eclipse Steel, 75%; Hollow Steel, 50-10%; Star Wire Rope, 50%; Tarbox Metal Snatch, 50%; Tarbox New Style Snatch, 50-10%; Wire Rope Snatch, 50%
Lane's Patent Automatic Lock and Junior.....30%
Stowell's Novelty, Mal. Iron.....50%
Stowell's Loading.....50-10%
See also Machines, Hoisting.

Boards, Stove—

Calipers—See Compasses.**Calks, Toe and Heel—**

Blunt, 1 prong... per lb. 44¢
 Sharp, 1 prong... per lb. 44¢
 Burke's Blunt, 44¢; Sharp, 44¢
 Gautier, Blunt, 44¢; Sharp, 44¢
 Perkins, Blunt, 44¢; Sharp, 44¢

Can Openers—

See Openers, Can.

Cans, Milk—

Illinois Pattern... 1.35 1.85 2.35 each.
 New York Pattern... 1.50 2.20 2.45 each.
 Baltimore Pattern... 1.50 2.20 2.45 each.
 Dubuque... 1.35 1.60 1.75 each.

Cans, Oil—

Buffalo Family Oil Cans:
 3 10 gal. \$18.00 60.00 120.00 gro. net.

Caps, Percussion—

Eley's E. B. 50¢
 G. D. 50¢
 F. L. 50¢
 G. E. 50¢
 Musket 50¢

Primers—

Berdan Primers, \$2 per M. 20¢
 Primer Shells and Bullets, 15¢
 All other primers per M. \$1.50

Cartridges—

Blank Cartridges:
 38 C. F., \$5.50... 10¢
 38 C. F., \$7.00... 10¢
 32 cal. Rim, \$1.50... 10¢
 32 cal. Rim, \$2.75... 10¢
 B. B. Caps, Con. Ball, Sigcd. \$1.90
 B. B. Caps, Round Ball... \$1.40
 Central Fire... 25¢
 Target and Sporting Rifle... 15¢
 Primed Shells and Bullets... 15¢
 Rim Fire, Sporting... 50¢
 Rim Fire, Military... 50¢

Castors—

Bed... 70¢
 Plate... 60¢
 Philadelphia... 75¢
 Acme, Ball Bearing... 70¢
 Boss... 70¢
 Boss Anti-Friction... 70¢
 Gem (Roller Bearing)... 80¢
 Martin's Patent (Phoenix)... 40¢
 Standard Ball Bearing... 40¢
 Tucker's Patent low list... 40¢
 Yale (Double Wheel) low list... 40¢

Cattle Leaders—

See Leaders, Cattle.

Chain, Coil—

American Coil, Straight Link:
 5-16 1/4 5-16 3/4 7-16 1/4 9-16
 \$9.15 6.30 5.35 4.35 4.35 4.10
 1/2 3/4 1-1/16 1-1/8 1-1/4 1-1/2 inch.
 \$4.00 3.50 3.55 3.95
 German Coil... 60¢

Halter—

Halter Chains... 60¢
 German Pattern Halter Chains
 List July 24, '97... 60¢
 Covert Mfg. Co. 35¢

Cow Ties—

See Halters and Ties.

Trace, Wagon, &c.—

Traces, Western Standard: 100 pr.
 6 1/2—6-3, Straight, with ring, \$27.00
 6 1/2—6-2, Straight, with ring, \$28.00
 6 1/2—8-2, Straight, with ring, \$32.00
 6 1/2—10-2, Straight, with ring, \$37.00

NOTE—Add 2c per pair for Hooks.
 Trivet Traces: add per pair for Nos. 2
 and 3, 2c; No. 1, 1c; No. 4, 4c to price of
 Straight Link.

Eastern Standard Traces, Wag-
 on Chain, &c... 60¢

Miscellaneous—

Jack Chain, list July 10, '93:
 Iron... 60¢
 Brass... 50¢
 Safety and Plumbers' Chain,
 60¢
 Gal. Pump Chain... 10¢
 Covert Mfg. Co.:
 Breast, Halter, Heel, Rein, Stal-
 lion... 40¢
 Oneida Community:
 American Halter, Dog and Kennel
 Chains... 35¢
 Niagara Dog Leads and Kennel
 Chains... 45¢
 Wire Goods Co.:
 Dog Chain... 70¢
 Universal Dbl.-Jointed Chain... 80¢

Chain and Ribbon, Sash—

Oneida Community:
 Copper Chain, 60¢; Steel Chain,
 60¢
 Pullman:
 Bronze Chain, 60¢; Steel Chain,
 60¢
 Sash Chain Attachments, per set, 5¢
 Aluminum Sash Ribbon, per 100
 ft... \$1.25
 Sash Ribbon Attachments, per set, 5¢

Chalk—(From Jobbers.)

Carpenters' Blue... 50¢
 Carpenters' Red... 48¢
 Carpenters' White... 40¢

Checks, Door—

Bardley's... 45¢
 Pullman, per gro... 50¢
 Russwin... 35¢

Chests, Tool—

American Tool Chest Co.:
 Boys' Chests, with Tools... 55¢
 Youths' Chests, with Tools... 40¢
 Gentlemen's Chests, with Tools... 30¢
 Farmers', Carpenters', etc., Chests,
 with Tools... 20¢

Machinists' and Pipe Fitters'

Chests, Empty... 50¢
 Tool Cabinets... 50¢
 C. E. Jennings & Co.'s Machinists'
 Tool Chests... 30¢

Chisels—**Socket Framing and Firmer**

Standard List... 75¢
 Buck Bros... 30¢
 Charles Buck Edge Tool Co... 30¢
 C. E. Jennings & Co.:
 Socket Firmer No. 10... 60¢
 Socket Framing No. 15... 60¢
 Swan's... 75¢
 L. & J. J. White Co... 30¢

Tanged—

Tanged Firmers... 40¢
 Buck Bros... 30¢
 Charles Buck Edge Tool Co... 30¢
 C. E. Jennings & Co. Nos. 191, 181... 25¢
 L. & J. J. White Co... 25¢

Cold—

Cold Chisels, good quality... 13¢
 Cold Chisels, fair quality... 11¢
 Cold Chisels, ordinary... 9¢

Chucks—

Almond Drill Chucks... 35¢
 Almond Turret Six-Tool Chucks... 40¢
 Beach Pat., each \$8.00... 35¢
 Empire... 25¢
 Blacksmiths'... 25¢
 Jacobs' Drill Chucks... 25¢
 Pratt's Positive Drive... 25¢
 Skinner Patent Chucks... 40¢
 Universal Reversible Jaws... 40¢
 Combination, Reversible Jaws... 40¢
 Drill Chucks, New Model, 25¢
 Standard, 40¢; Skinner Pat.,
 25¢; Positive Drive... 40¢
 Face Plate Chucks... 40¢
 Standard Tool Co.:
 Improved Drill Chuck... 45¢
 Union Mfg. Co.:
 Combination, Nos. 1, 2, 3, 4, 5, 6,
 7, 8 and 17, 40¢; No. 21... 35¢
 Scroll Combination, Nos. 82 and
 84... 30¢
 Geared Scroll, Nos. 33, 34 and 35... 30¢
 Independent Iron, Nos. 18 and 318... 35¢
 Independent Steel, No. 64... 25¢
 Union Drill, Nos. 600, 60, 100, 101,
 102, 103, 104... 35¢
 Union Car Drill... 25¢
 Universal, 11, 12, 16, 17, 13, 14, 15... 35¢
 Universal, No. 42... 30¢
 Iron Face Plate Jaws, Nos. 28, 30,
 48 and 50... 35¢
 Steel Face Plate Jaws, Nos. 70 and
 72... 30¢
 Westcott Patent Chucks:
 Lathe Chucks... 50¢
 Little Giant Auxiliary Drill... 50¢
 Little Giant Double Grip Drill... 50¢
 Little Giant Drill, Improved... 50¢
 Oneida Drill... 50¢
 Scroll Combination Lathe... 50¢

Clamps—

Adjustable, Hammers... 20¢
 Carriage Makers, P. S. & W.
 Co... 40¢
 Besly, Parallel... 35¢
 Lineman's, Utica Drop Forge & Tool
 Co... 40¢
 Wood Workers, Hammers... 40¢
 Saw Clamps, see Vises, Saw Filers.

Cleaners, Drain—

Iwan's Champion, Adjustable... 55¢
 Iwan's Champion, Stationary... 45¢

Sidewalk—

Star Socket, All Steel... \$4.25 net
 Star Shank, All Steel... \$3.24 net
 W. & C. Shank, All Steel... \$4.00
 7 1/2 in. \$3.00; 8 in. \$3.25.

Cleavers, Butchers'—

Foster Bros... 30¢
 Fayette R. Plumb... 30¢
 L. & J. J. White Co... 30¢

Clippers, Horse and**Sheep—**

Chicago Flexible Shaft Company:
 1902 Chicago Horse, each... \$1.75
 20th Century Horse, each... \$5.00
 Lightning Belt Horse, each... \$15.00
 Chicago Belt Horse, each... \$20.00
 Stewart's Enclosed Gear
 Horse, each... \$1.75
 Stewart's Patent Sheep Shear-
 ing Machine, each... \$12.75
 Stewart Enclosed Gear Shear-
 ing Machine, No. 8, each... \$9.75

Clips, Axle—

Regular Styles, list July 1, '05... 80¢

Cloth and Netting, Wire

—See Wire, &c.

Cocks, Brass—

Hardware list:
 Plain Bibbs, Globe, Kerosene,
 Racking, Liquor, Bottling,
 &c... 60¢
 Compression Bibbs... 55¢

Coffee Mills—

See Mills, Coffee.

Collars, Dog—

Nickel Chain, Walter B. Stevens &
 Son's list... 40¢
 Leather, Walter B. Stevens & Son's
 list... 40¢

Combs, Curry—

Metal Stamping Co... 40¢

Compasses, Dividers, &c.

Ordinary Goods... 70¢
 Wm. Schollhorn Co.:
 Excelsior Dividers... 55¢
 Lodi Dividers... 75¢

Conductor Pipe—

L. C. L. to Dealers:

Galv. Charcoal Copper.
 Steel. Iron, 14, 16, 20 oz.
 Eastern:
 70¢ 80% 90% 100%

Central:

65¢ 12 1/2 55¢ 55¢ 30¢ 7 1/2 1/2
 Western and Southern:
 65¢ 7 1/2 55% 30¢ 5 1/2
 So. Western:
 62 1/2 50¢ 2 1/2 30¢ 2 1/2 1/2

Terms, 60 days; 2 1/2 cash 10 days. Fac-
 tory shipments generally delivered.

Coolers, Water—

See also Eave Troughs.
 Gal, each... 2 3 4 6 8
 Labrador... \$1.20 \$1.50 \$1.80 \$2.10 \$2.70
 Gal... 3 4 5 6 8
 Iceland, ea. \$1.80 \$2.10 \$2.40 \$3.00
 Gal... 2 3 4 6 8
 Galvanized, ea. \$1.85 \$2.00 \$2.25 \$2.90 \$3.90
 Galvanized, Lined, side handles,
 Gal... 2 3 4 6 8
 Each... \$1.95 \$2.15 \$2.40 \$3.30 \$4.15
 White Enamelled, 25%; Agate Lined, 25%

Coopers' Tools—

See Tools, Coopers'.

Coppers' Soldering—

Soldering Coppers, 3 lbs. to pair
 and heavier, 32¢; lighter
 than 3 lb. to pair... 34¢

Cord—

Braided, Drab... 10¢

Braided, White, Com., Nos. 8
 to 12, 20¢; No. 7, 20¢; No. 6,
 27¢.

Cable Laid Italian, lb., No. 18... 37¢

Italian, lb., A, No. 18, 25¢; B, 22¢

Common India... lb., 11¢

Cotton Sash Cord, Twisted, 18¢

Patent Russia... lb., 20¢

Cable Laid Russia... lb., 21¢

India Hemp, Br'd'd... lb., 21¢

India Hemp, Twisted... lb., 13¢

Patent India, Twisted... lb., 17¢

Anniston Cordage Co.: lb. solid

Braided, Nos. 8 to 12, \$0.24; No. 7,

\$0.21 1/2; No. 6, \$0.25; lb. doz., 50 ft.

Orion, \$2.00; 50 ft., Columbia, \$0.85;

50 ft., Victoria, \$1.00; 50 ft., 6-Thread,

\$1.10; 60 ft., 3-Thread, \$0.95; 50 ft.,

Manila, \$1.40; 60 ft., Jute, \$0.75.

Pearl Braided, cotton, No. 6, lb. doz.,

27¢; No. 7, 26¢; Nos. 8 to 12, 26¢

Eddystone, Braided, Nos. 8 to 12,

26¢; 7, 26¢; 6, 27¢.

Harmony Cable Laid Italian, Nos. 7

to 10... lb. doz. 23¢

Pullman's

Wire Sash Cord... 10¢

Sash Cord Attachments, per doz. 10¢

Samson, Nos. 8 to 12:

Braided, lb. Drab Cotton,

55¢; Linen Hemp, 40¢

50¢; Linen, 55¢; White Cot-

ton, 80¢; Spot Cord... 50¢

Massachusetts, White... lb. doz. 40¢

Massachusetts, Drab... lb. doz. 45¢

No. 7, 28¢; No. 6, 30¢.

Phoenix, White, Nos. 8 to 12, 27¢;

Silver Lake, per lb.:

A, Drab, 45¢; A, White, 40¢;

B, Drab, 40¢; B, White, 35¢;

Italian Hemp, 40¢; Linen... 57¢

See also Chain and Ribbon.

Wire, Picture—

List July 19, 1906... 55¢

Hendry Standard Wire Picture Cord,

old list, 55¢

Turner & Stanton Co. Wire Picture

Cord... 50¢

Cradles—

Grain... 40¢

Crayons—

White Round Crayons, Cases, 100

gro., \$6.50; \$7.50 at factory, but

lower prices made by jobbers

Zelnicke's Lumber... gro.

White and Purple, Indelible... \$7.50

Blue, Red, Green, Yellow and

Terra Cotta, \$6.50; Black... \$4.00

Giant Lumber, 5 1/2 in. x 15-16 in.

round, all colors, \$16.25; Indel-

ible... \$18.75

Genuine Soapstone, Metal Workers',

5 in. x 1/4 in. Round, \$2.50; 5 in. x

3/4 in. Square, \$1.75; 5 x 1/2 x 3-1/4,

\$2.50; 5 x 1 1/4 x 3-1/16... \$3.00

Crooks, Shepherds'—

Fort Madison, per doz., Heavy, \$7.00;

Light... \$6.50

Crow Bars—See Bars, Crow.**Cultivators—**

Victor Garden... 50%

Cutlery, Table—

International Silver Company:

No. 12 M'd'm Knives, 1817, lb. doz. \$3.50

Star, Eagle, Rogers & Hamilton

and Anchor... lb. doz. \$3.00

Wm. Rogers & Son... lb. doz. \$2.50

Cutters—

H. H. Mayhew Co... 40%

Red Devil... 50%

Smith & Hemenway Co... 50%

Woodward... 40%

Meat and Food—

American... 30%

Nos. 401 402 403 404 405 406 407

Each... \$5 \$7 \$10 \$12 \$25 \$50 \$60

Enterprise:

Nos. 5 10 12 22 32

Each... \$2 \$3 \$2.75 \$1.50 \$4 25¢ 7 1/2

No. 202, \$1.50... 40¢

Dixon's... lb. doz. 30¢

Nos. \$14.00 \$17.00 \$19.00 \$30.00

Ideal... 40¢

Little Giant... lb. doz. 40¢

Nos. 305 310 312 320 322

\$35.00 \$48.00 \$44.00 \$72.00 \$68.00

N. E. Food Choppers... 25%

New Triumph No. 608, lb. doz. \$14.00

Russwin Food, No. 1, \$21.00; No. 2,

\$27.00... 45¢

Woodruff's... lb. doz. 30¢

Nos. 100 150

Enterprise Beef Shavers... 25¢

Slaw and Kraut—

Henry Dismont & Sons:
 Slaw and Kraut Cutters... 35%

Extractors, Lemon Juice

—See Squeezers, Lemon.
Fasteners, Blind—

Zimmerman's 50¢ & 10¢
 Walling's 40¢ & 10¢

Cord and Weight—

Ives 33½%

Faucets—

Cork Lined 50¢ & 10¢
 Metallic Key, Leather Lined 60¢ & 10¢

Red Cedar 70¢ & 10¢
 Petroleum 70¢ & 10¢

L. & L. B. Co.'s 60¢ & 10¢
 Metal Key 60¢ & 10¢

Star 50¢ & 10¢
 West Lock 50¢ & 10¢

John Sommer's Peerless Tin Key 40¢
 John Sommer's Boss Tin Key 50¢

John Sommer's Victor M. Key 50¢ & 10¢
 John Sommer's Duplex Metal Key 60¢

John Sommer's Diamond Lock 40¢
 John Sommer's I. X. L. Cork Lined 50¢

John Sommer's Reliable Cork Lined 50¢ & 10¢

John Sommer's Chicago Cork Lined 50¢
 John Sommer's O. K. Cork Lined 50¢

John Sommer's No Brand, Cedar 50¢
 John Sommer's Perfection, Cedar 40¢

McKenna, Brass 50¢ & 10¢
 Burglar Proof, N. P. 25¢

Improved, ½ and ¾ inch 25¢
 Self Measuring 25¢

Enterprise, ½ doz. \$36.00 40¢ & 10¢
 Lane's, ½ doz. \$36.00 40¢ & 10¢

National Measuring, ½ doz. \$36.40 40¢ & 10¢

Felloe Plates—

See Plates, Felloe.

Files— Domestic—

List Nov. 1, 1899.

Best Brands 70¢ & 10¢
 Standard Brands 75¢ & 10¢

Lower Grade 75¢ & 10¢
 Imported 75¢ & 10¢

Stubs' Tapers, Stubs' Hat, July 24, '97 33 1-3 @ 10¢

Fixtures, Fire Door—

Richards Mfg. Co.:
 Universal, No. 103; Special, No. 104 \$2.75

Fusible Links, No. 96 50¢
 Expansion Bolts, No. 107 60¢ & 10¢

Grindstone—

Net Prices:
 Inch 15 17 19 21

Per doz. \$3.25 3.75 4.25 4.75

P. & W. Co. 30¢ & 10¢
 Reading Hardware Co. 60¢

Stowell's Giant Grindstone Hanger, 9 doz. \$6.00

Stowell's Grindstone Fixtures, Extra Heavy, 40¢ & 10¢; Light 50¢

Fodder Squeezers—

See Compressors.

Forks—

NOTE.—Manufacturers are selling from the list of September 1, 1904, but many jobbers are still using list of August 1, 1899, or selling at net prices.

Iowa Dig-Ezy Potato 60¢ & 10¢
 Victor, Hay 60¢ & 10¢

Victor, Manure 60¢ & 10¢
 Victor, Header 60¢ & 10¢

Champion, Hay 60¢ & 10¢
 Champion, Header 60¢ & 10¢

Champion, Manure 60¢ & 10¢
 Columbia, Hay 60¢ & 10¢

Columbia, Header 60¢ & 10¢
 Columbia, Manure 60¢ & 10¢

Columbia, Spading 70¢ & 10¢
 Hawkeye Wood Barley 40¢

W. & C. Potato Digger 60¢ & 10¢
 Acme Hay 60¢ & 10¢

Acme, Manure, 4 time 60¢ & 10¢
 Dakota Header 60¢ & 10¢

Jackson Steel Barley 60¢ & 10¢
 Kansas Header 60¢ & 10¢

W. & C. Favorite Wood Barley 40¢
 Plated.—See Spoons.

Frames— Saw—

White, 8' x 12' Bar, per doz. 75¢ @ \$8.04

Red, 8' x 12' Bar, per doz. \$1.00 @ \$1.25

Red, 8' x 12' Bar, per doz. \$1.40 @ \$1.59

Freezers, Ice Cream—

Qt. 1 2 3 4 5 6

Each \$1.30 \$1.60 \$1.90 \$2.20 \$2.50 \$2.80

Fruit and Jelly Presses—

See Presses, Fruit and Jelly.

Fry Pans—See Pans, Fry.**Fuse—**

Per 1000 Feet.
 Hemp \$2.75

Cotton 3.50

Waterproof Spl. Taped 5.65

Waterproof Dbl. Taped 4.40

Waterproof Tpl. Taped 5.15

Gates, Molasses and Oil—

Stebbins' Pattern 80¢ & 10¢

Gauges—

Marking, Mortise, &c. 50¢ @ 50¢ & 10¢

Chapin-Stephens Co.:
 Marking, Mortise, &c. 50¢ & 10¢

Diston's Marking, Mortise, &c. 60¢ & 10¢

Stanley R. & L. Co.'s Butt and Rabbet Gauge 25¢

Marking and Mortise 25¢

Wire, Brown & Sharpe's 35¢

Wire, Morse's 25¢

Wire, P. S. & W. Co. 25¢

Gimlets— Single Cut—

Numbered assortments, per gro.

Nail, Metal, No. 1, \$2.00; 2, \$2.30

Spike, Metal, No. 1, \$4.00; 2, \$4.30

Nail, Wood Handled, No. 1, \$2.30; 2, \$2.60

Spike, Wood Handled, No. 1, \$4.30; 2, \$4.60

Glass, American Window

See Trade Report.

Glasses, Level—

Chapin-Stephens Co. 60¢ & 10¢

Glue, Liquid Fish—

Bottles or Cans, with Brush 25¢ & 10¢

International Glue Co. (Martin's) 40¢

Grease, Axle—

Common Grade gro. \$1.50 @ \$6.00

Dixon's Everlasting, 10-lb. pails, ea. 85¢; in boxes, ½ doz., 1 lb. \$1.20;

2 lb. \$2.00

Helmet Hard Oil 25¢

Griddles, Soapstone—

Pike Mfg. Co. 33½¢ @ 33½¢ & 10¢

Grindstones—

Pike Mfg. Co.:
 Improved Family Grindstones, ½

inch, ½ doz., \$2.00 33½%

Royal Mfg. Co.:
 Alundum Grinding Machines, each,

Nos. 01, \$1.75; 1A, \$2.50; 1B, \$5.00

Alundum Sickle Grinders, each, No. 20A, \$6.00; 20A Combined, \$6.50

Alundum Disc Grinders, each, \$2.50 30%

Grips, Nipple—

Perfect Nipple Grips 40¢ & 10¢

Halters and Ties—

Cow Ties 60¢ & 10¢

Covert Mfg. Co.:
 Web 30¢ & 25¢

Jute Rope 35¢

Sisal Rope 20¢

Cotton Rope 45¢

Hemp Rope 45¢

Onida Community 40¢ & 10¢

Am. Cow Ties 45¢ & 10¢

Niagara Coil and Halters 45¢ & 10¢

Niagara Cow Ties 45¢ & 10¢

Hammers—**Handled Hammers—**

Heller's Machinists' 55¢ & 10¢

Heller's Farriers' 40¢ & 10¢

Magnetic Tack, Nos. 1, 2, 3, \$1.25; \$1.50; \$1.75

Peck, Stow & Wilcox, Steel 50¢

Fayette R. Plumb:
 Plumb, A. E. Nail 40¢ & 10¢

Engineers' and B. S. Hand 40¢ & 10¢

Machinists' Hammers 50¢ & 10¢

Riveting and Tinner 40¢ & 10¢

Heavy Hammers and Sledges—

Under 3 lb., per lb., 50¢ @ 50¢ & 10¢

3 to 5 lb., per lb., 40¢ @ 40¢ & 10¢

Over 5 lb., per lb., 30¢ @ 30¢ & 10¢

Wilkinson's Smiths' lb. 9¢ @ 10¢

Handles—**Agricultural Tool Handles**

Axe, Pick, &c. 60¢ & 10¢

Hoe, Rake, &c. 40¢ & 10¢

Fork, Shovel, Spade, &c. 40¢ & 10¢

Long Handles 40¢ & 10¢

D Handles 40¢ & 10¢

Cross-Cut Saw Handles—

Atkins' 40¢

Champion 50¢

Diston's 50¢

Mechanics' Tool Handles—

Auger, assorted gro. \$2.50 @ \$3.00

Bradawl gro. \$1.50 @ \$1.75

Chisel Handles, Ass'd, per gro.:
 Tanged Firmer, Apple, \$2.40 @ \$2.65; Hickory, \$2.15 @ \$2.40

Socket Firming, Apple, \$1.75 @ \$1.95; Hickory, \$1.45 @ \$1.60

Socket Framing, Hickory, \$1.00 @ \$1.15

File, assorted gro. \$1.30 @ \$1.40

Hammer, Hatchet, &c. 60¢ & 10¢

Hand Saw, Varnished, doz. 80¢ & 10¢; Not Varnished, 65¢ & 10¢

Plane Handles:
 Jack, doz. 30¢; Jack, Bolted, 75¢

Fore, doz. 45¢; Fore, Bolted, 90¢

Chapin-Stephens Co.:
 Carving Tool 60¢ & 10¢

Chisel 60¢ & 10¢

File and Awl 60¢ & 10¢

Saw and Plane 40¢ & 10¢

Screw Driver 40¢ & 10¢

Millers Falls Adj. and Hatchet Auger 40¢ & 10¢

Nicholson Simplicity File Handle 40¢ & 10¢

Hangers—

NOTE.—Barn Door Hangers are generally quoted per pair, without track, and Parlor Door Hangers per double set with track, &c.

Allith Mfg. Co.:
 Reliable, No. 1; Allith, No. 3; Al-

Chicago Spring Butt Co.:
 Friction 25%

Oscillating 25%

Big Twin 25%

Chisholm & Moore Mfg. Co.:
 Baggage Car Door 50%

Cleveland and Peckish 70%

Railroad 50%

Cronk & Carrier Mfg. Co.:
 Loose Axle 60¢ & 10¢

Roller Bearing 70%

Griffin Mfg. Co.:
 Solid Axle, No. 10, \$12.00 70%

Roller Bearing, No. 11, \$15.00 70%

Roller Bearing, Ex. Hy., No. 22, \$18.00 70%

Hinged Hangers, \$16.00 60¢ & 10¢

Lane Bros. Co.:
 Parlor, Ball Bearing, \$1.00; Standard, \$3.15; No. 105, \$2.85; New Model, \$2.50; New Cham-

ber 25%

Barn Door Standard 60¢ & 10¢

Hinged net \$6.08

Covered 60¢ & 10¢

Special 70¢ & 10¢

Lawrence Bros.:
 Advance and Sterling 60¢ & 10¢

Cleveland and Peckish 70%

Clipper, No. 75 60¢ & 10¢

Crown 60¢ & 10¢

Cyclone-Tandem net \$7.50

Easy Parlor Door, Dbl. Sets, \$2.50; Single Sets, \$1.25 60%

Hammer 70¢ & 10¢

New Cyclone, Flexible, \$16.00 60%

New York 60¢ & 10¢

McKinney Mfg. Co.:
 No. 1, Special, \$18.00 60¢ & 10¢

Hinged Hangers, \$16.00 50%

Meyers' Stayon Hangers 60¢ & 10¢

Richards Mfg. Co.:
 Hangers, Nos. 47, 65, 147, 217, 60¢ & 10¢

Pioneer Wood Track, No. 3, \$2.25

Roller B'r'g. St'l Track No. 12, \$2.20

Roller B'r'g. St'l Track No. 13, \$2.50

Roller B'r'g. No. 39, 41, 43, 70¢ & 10¢

Hero, Adj. Track No. 19, 50¢ & 10¢

Adjustable Track Tandem Trol-

ley Track No. 16 50¢ & 10¢

Auto Adj. Track No. 22 50¢ & 10¢

Trolley B. D. No. 17, \$1.25; F. D. No. 120, \$2.25; No. 121, \$2.45; No. 150 \$2.50

Safety Underwriters F. D. No. 101 50%

Tandem No. 41, 2½ and 3 60¢ & 10¢

Palace, Adjustable Track No. 132 50¢ & 10¢

Royal, Adjustable Track No. 125 50¢ & 10¢

Ives' Wood Track No. 1, \$2.25

Trolley B. D. No. 20 50¢ & 10¢

Trolley B. D. No. 24, \$1.30; No. 27, \$1.40; No. 28 \$1.60

Roller Bearings, Nos. 37, 38, 39, 41, 43, 44, Sizes 1 and 2, 70¢ & 10¢

Anti-friction, No. 42; No. 44, 2½ and 3 60¢ & 10¢

Hinged Tandem No. 48 60¢ & 10¢

Folding Door B. B. Swivel No. 135 40%

Stowell Mfg. & Foundry Co.:
 Acme Parlor Ball Bearing 30%

Apex Hinge Door 40%

Apex Parlor Door 50¢ &

Hitchers, Stall—

Covert Mfg. Co., Stall Hitchers. 30&2%

Hods—Coal—

M'Pora Hat, price per gross.
 Inch 15 16 17 18
 Galv. Open... \$35 \$39 \$42 \$46
 Jap. Open... 26 28 31 35
 Galv. Funnel... 43 48 52 56
 Jap. Funnel... 33 36 39 43

Masons' Etc.—

Cleveland Wire Spring Co.

Steel Brick, No. 182... each \$1.05

Steel Mortar, No. 158... each \$1.35

Hoes—Eye—

Scovill and Oval Pattern...

Grub, list Feb. 23, 1899...

D. & H. Scovill... 30%

Handled—

NOTE—Manufacturers are selling

from the list of September 1, 1904, but

many jobbers are still using list of

August 1, 1899, or selling at net prices.

Cronk's Wedding, No. 1, \$2.75; No. 2, \$2.50

Star Double Bit... \$3.20

Ft. Madison Cotton Hoe... 70&10&10%

Ft. Madison Crescent Cultivator Hoe...

Ft. Madison Mattock Hoes...

Regular Weight... doz. 60%

Junior Size... doz. \$4.00

Ft. Madison Sprouting Hoe... doz. 50%

Ft. Madison Dixie Tobacco Hoe...

Kretzinger's Cut Easy... 75&10&10%

Warren Hoe... 70&10

W. & C. L'ning Hoe... 75&10

B. B. 6 in. Cultivator Hoe... \$3.15

B. B. 6 in. in... \$3.35

Acme Wedding... doz. net, \$4.35

W. & C. L'ning Shuffie Hoe... doz. \$4.85

Hoisting Apparatus—

See Machines, Hoisting.

Holders—Bit—

Angular, doz. \$24.00... 45&10%

Door—

Bardsley's, Iron, 40%; Brass and

Bronze... 33%

Empire... 35%

Pulman... 35%

Superior... 33%

File and Tool—

Nicholson File Holders and File

Handles... 33&40%

Fruit Jar—

Triumph Fruit Jar Holder, doz. gross,

\$10.80; doz. \$1.25

Trace and Rein—

Fernald Double Trace Holder, doz.

pairs... \$1.25

Dash Rein Holder, doz. pairs... \$1.25

Hones—Razor—

Pike Mfg. Co., Belgian, German and

Swaty... 50%

Hooks—Cast Iron—

Bird Cage, Reading... 40%

Clothes Line, Reading List... 40%

Clothes Line, Stowell's... 70%

Coat and Hat, Reading... 45&20%

Coat and Hat, Stowell's... 70%

Coat and Hat, Wrightsville... 40%

Harness, Reading List... 40%

Harness, Stowell's... 60%

School House, Stowell's... 70%

Wire—

Belt... 80%

Wire C. & H. Hooks... 75&10&75&10&10%

Columbian Hdw. Co., Gem... 70&5%

Parker Wire Goods Co., King... 70&10%

Western W. G. Co. Molding... 75%

Wire Goods... Chief, 70%; Crown,

Acme, 60&10%; 75%; V. Brace, 75%;

Czar Harness, 60&10%.

Wrought Iron—

Box, 6 in., per doz., \$1.00; 8 in.,

\$1.25; 10 in., \$2.50.

Cotton... doz. \$1.05&\$1.25

Wrought Stapled, Hooks, &c.—

See Wrought Goods.

Miscellaneous—

Hooks, Bench, see Stops, Bench.

Bush, Light, doz. \$1.75; Medium,

\$5.35; Heavy, \$6.25

Grass, best, all sizes, per doz. \$1.60

Grass, common grades, all sizes,

per doz. \$1.30

Whiffletree... lb. 5&6¢

Hooks and Eyes:

Brass... 60&50&60&10&5%

Malleable Iron... 70&70&10%

Covert Mfg. Co. Gate and Scuttle

Hooks... 40%

Ft. Madison Cut-Easy Corn Hooks,

Turner & Stanton Co. Cup and

Shoulder... 30&10&10%

Bench Hooks—See Bench Stops.

Corn Hooks—See Knives, Corn.

Horse Nails—

See Nails, Horse.

Horsehoes—

See Shoes, Horse.

Hose, Rubber—

Garden Hose, 1/2-inch:

Competition... ft. 5 @ 6¢

3-ply Guaranteed... ft. 8 @ 9¢

4-ply Guaranteed... ft. 10 @ 11¢

Cotton Garden, 1/2-in. coupled:

Low Grade... ft. 8 @ 9¢

Fair Quality... ft. 10 @ 11¢

Irons—Sad—

From \$1 to 10... lb. 3 @ 3¢

B. D. Sad Irons... lb. 3 @ 3¢

Mrs. Potts' cents per set:

Nos. 80 85 90 95

Jap'd Tops... 90 77 90 92

Tind's Tops... 85 82 95 92

New England Pressing... lb. 5¢ @ 1¢

Pinking—

Pinking Irons... doz. 60¢

Irons, Soldering

See Copiers.

Jacks, Wagon—

Covert Mfg. Co.

Auto Screw... 30&2%; Steel, 45%

Lockport... 50%

Lane's Steel... 30&10&2%

Richards' Tiger Steel, No. 130... 50&10%

Smith & Hemenway Co.'s... 25%

Kettles—

Brass, Spun, Plain... 20&25%

Enamelled and Cast Iron—See Ware,

Hollow.

Knives—

Butcher, Kitchen, &c.—

Foster Bros. Butcher, &c.—

Wilkinson Shear & Cutlery Co.—

Wilkinson Shear & Cutlery Co.

Witlington Acme... doz. \$2.65;

Dent, \$2.75; Adj. Serrated, \$2.20;

Serrated, \$2.10; Yankee No. 1, \$1.00;

Yankee No. 2, \$1.15.

Corn—

Wilkinson Shear & Cutlery Co.

Witlington Acme... doz. \$2.65;

Dent, \$2.75; Adj. Serrated, \$2.20;

Serrated, \$2.10; Yankee No. 1, \$1.00;

Yankee No. 2, \$1.15.

Drawing—

Standard List... 75&50&75&10%

C. E. Jennings & Co., Nos. 45, 46, 60

Jennings & Griffin, Nos. 41, 42... 75%

Swan's... 70%

Watrous... 15%

L. & J. White... 20&5&25%

Hay and Straw—

Serrated Edge, per doz. \$5.75&6.00

Iwan's Sickle Edge... doz. \$9.50

Iwan's Serrated... doz. \$10.00

Mincing—

Buffalo... gro. \$13.90

Miscellaneous—

Farriers'... doz. \$3.00&\$3.25

Wostenholm's... doz. \$3.00&\$3.25

Knobs—

Base, 1/2-inch, Birch, or Maple,

Rubber Tip... gro. \$1.25&\$1.40

Carriage, Jap., all sizes... 40%

Door, Mineral... doz. 40&45¢

Door, Por. Jap'd... doz. 70&75¢

Door, Por. Nickel... doz. \$2.05&\$2.15

Bardsley's Wood Door, Shutters, &c. 15%

Lacing, Leather—

See Belting, Leather—

Ladders, Store, &c.—

Allith Mfg. Co., Reliable... 50%

Lane's Store... 25%

Myers' Noiseless Store Ladders... 50%

Richards Mfg. Co.

Improved Noiseless, No. 112... 50%

Climax Shelf, No. 113... 50%

Trolley, No. 109... 50%

Ladles, Melting—

L. & G. Mfg. Co. (low list)... 25%

P. S. & W... 40&10%

Reading... 60%

Lanterns—Tubular—

Regular Tubular, No. 0... doz. \$4.25&\$4.50

Lift Tubular, No. 0... doz. \$4.75&\$5.00

Hinge Tubular, No. 0... doz. \$4.75&\$5.00

Other Styles... 40&10&5%

Bull's Eye Police—

No. 1, 2 1/2-inch... \$2.75&\$3.00

No. 2, 3-inch... \$3.00&\$3.25

Lasts and Stands, Shoe—

Stowell's Atlas, Malleable Iron... 50%

Stowell's Badger, Cast Iron... 50%

Latches—Thumb—

Roggin's Latches, with screw... doz. 35&40¢

Door—

Allith Mfg. Co., Automatic, No.

400, doz. \$4.00

Crank & Carrier Mfg. Co., No. 101,

doz. \$2.90

Cronk & Carrier Mfg. Co., Latch,

Hasp and Staples... 50%

Richards' Bull Dog, Heavy, No.

125... 50&5%

Richards' Trump, No. 127... \$1.60

Stowell's Steel... 50%

Leaders, Cattle—

Small... doz. 50¢; large, 60¢

Covert Mfg. Co.

Cotton, 45%; Hemp, 45%; Jute, 35%;

Sisal, 20%.

Lifters, Transom—

R. & E... 10%

Lines—

Wire Clothes, Nos. 18 19 20

100 feet... \$2.25 2.60 1.75

75 feet... \$1.75 1.35 1.10

Anniston Waterproof Clothes, 50 ft.

per gro. \$25.00; Gilt Edge, \$20.00; Air

Line, \$23.00; Acme, \$18.00; Alabama,

\$17.00; Empire, \$16.00; Advance,

\$14.00; Eclipse, \$13.50; Chicago,

\$11.50; Standard, \$10.50; Columbia,

\$9.50; Allston, \$13.50; Calhoun, \$12.00.

Samson Cordage Works:

Solid Braided Chalk, No. 8 to 3, 40%

Solid Braided Mason's... 30%

Silver Lake Braided Chalk, No. 0,

\$8.00; No. 1, \$6.50; No. 2, \$7.00; No.

3, \$7.50.

Masons' Lines, Shade Cord, &c.:

White Cotton, No. 3/4, \$1.50; No. 4,

\$2.00; No. 4 1/2, \$2.50; Cotton, No. 3 1/2,

\$1.75; No. 4, \$2.25; No. 4 1/2, \$2.75;

Linen, No. 3 1/2, \$2.50; No. 4, \$3.50;

No. 4 1/2, \$4.50.

Tent and Awning Lines: No. 5,

White Cotton, \$7.50; Drab Cotton,

\$8.50.

Clothes Lines, White Cotton, 50 ft.

\$2.75; 60 ft. \$3.25; 70 ft. \$3.75; 75

ft. \$4.00; 80 ft. \$4.25; 90 ft. \$4.75;

100 ft. \$5.25.

Locks—Cabinet—

Cabinet Locks... 33 1/2 %

Door Locks, Latches, &c.—

NOTE—Net prices are very often made

on these goods.

Reading Hardware Co... 40%

R. & E. Mfg. Co... 10%

Elevator—

Stowell's... 50%

Padlocks—

R. & E. Mfg. Co. Wrought Steel and

Brass... 75&10%

Sash, &c.—

Ives' Patent:

Bronze and Brass, 60%; Crescent,

40&20%; Iron, 60%; Window Ven-

tilating, 55%; Robinson Pat. Ven-

tilating Sash Lock, 3 1/2%; Wrought

Bronze and Brass, 55%; Wrought

Steel, 55%.

Pullman Patent Ventilating Lock... 35%

Reading... 40%

Machines—Boring—

Com. Up'r, without Augers,

\$2.00&\$2.25

Com. Ang'l'r, without Augers,

\$2.25&\$2.50

Swan's Improved... 40&10%

Jennings', Nos. 1 and 4... 35%

Millers' Falls... 5.75

Snell's, Upright, \$2.65; Angular, \$2.90

Corking—

Reisinger Invincible Hand Power...

Williams' Fence Machines... each, \$5.50

Fence—

Moore's Anti-Friction Chain Hoist... 30%

Moore's Hand Hoist, with Lock

Brake... 20%

Moore's Cyclone High Speed Chain

Hoist... 25%

Ice Cutting—

Potato—
Saratoga..... doz. \$7.00
White Mountain..... doz. \$6.00

Picks and Mattocks—
List, Feb. 23, 1899..... 70¢@10¢75¢
Cronk's Handled Garden Mattock,
doz., No. 2, \$2.50; No. 3, \$3.40.

Pinking Irons—
See Irons, Pinking.

Pins, Escutcheon—
Brass..... 50¢@10¢60¢
Iron, list Nov. 11, '85..... 60¢@60¢10¢

Pipe, Cast Iron Soil—
Carload lots.

Standard, 2-6 in. 50¢@10¢50¢
Extra Heavy, 2-6 in. 50¢@10¢50¢
Fittings..... 70¢@10¢70¢@10¢50¢

Pipe, Merchant—
Consumers, Carloads.

	Steel.	Iron.	Galv.
1/4 & 3/4 in.	51	64.5	48.5
5/8 in.	69	64.5	56.5
1 1/2 in.	71	59	62.5
2 to 6 in.	75	55	62.5
7 to 12 in.	70	55	53

Pipe, Vitriol Sewer—
Carload lots.

Standard Pipe and Fittings, 3
to 24 in., f.o.b. factory:
First-class..... 85¢@86¢
Second-class..... 90¢
NOTE.—Market irregular.

Pipe, Stone—
Per 100 joints.

	C. L.	L. G. L.
Edwards' Nested:		
5 in., Standard Blue.....	7.25	7.75
6 in., Standard Blue.....	7.75	8.00
7 in., Standard Blue.....	7.75	8.00
8 in., Royal Blue.....	7.50	8.50
9 in., Royal Blue.....	7.50	8.50
10 in., Royal Blue.....	8.50	9.50

Planes and Plane Irons—
Wood Planes—

Bench, first qual..... 30¢@30¢10¢
Bench, second qual..... 40¢@40¢10¢
Molding..... 25¢@25¢10¢
Bailey's (Stanley R. & L. Co.) 35¢@25¢
Chapin-Stephens Co.:
Bench, First Quality..... 30¢
Bench, Second Quality..... 40¢
Molding and Miscellaneous..... 25¢
Toy and German..... 30¢
Union..... 60¢

Iron Planes—
Bailey's (Stanley R. & L. Co.) 35¢
Chapin's Iron Planes..... 50¢@10¢
Miscellaneous Planes (Stanley R. & L. Co.) 50¢@5¢
Union..... 60¢

Plane Irons—
Wood Bench Plane Irons, list

Dec. 12, '06..... 25¢
Buck Bros..... 30¢
Chapin-Stephens..... 30¢
Stanley R. & L. Co..... 35¢
Union..... 50¢
L. & J. J. White..... 30¢@25¢

Planters, Corn, Hand—
Kohler's Eclipse..... doz. \$2.00

Plates—
Felloe..... 70¢@14¢
Self-Sealing Pie Plates (H. M. Co.) doz. \$2.00..... 50¢

Pliers and Nippers—
Button Pliers..... 70¢@10¢75¢, 20, 55¢
Gas Burner, per doz., 5 in., \$1.25
@ \$1.30; 6 in., \$1.45 @ \$1.50.
Gas Pipe..... 7 8 10 12 in.
\$2.00 \$2.25 \$2.75 \$3.50

Acme Nippers—
Cronk & Carrier Mfg. Co.:
American Button..... 60¢
Improved Button..... 75¢@10¢
Cronk's..... 60¢
No. 50 Linemen's..... 45¢
Stub's Pattern..... 45¢
Combination and others..... 33¢
Heller's Farriers' Nippers, Pincers
and Tools..... 40¢@50¢@10¢5¢
The Nettleton Mfg. Co. Reversible
Cutting Nippers..... 40¢
P. S. & W. Timmers' Cutting Nip-
pers..... 40¢
Wm. Schollhorn Co.:
Bernard, 33 1/4%; Elm City, 33 1/4%;
Paragon, 50%; Lodi, 50%.
Swedish Side, End and Diagonal Cut-
ting Pliers..... 50¢
Utica Drop Forge & Tool Co.:
Pliers and Nippers, all kinds..... 40¢

Plumbs and Levels—
Chapin-Stephens Co.:
Plumbs and Levels..... 30¢@30¢10¢5¢
Chapin's Imp. Bram Cor. 40¢@10¢10¢
Pocket Levels..... 30¢@30¢10¢5¢
Extension Sights..... 30¢@30¢10¢5¢
Machinists' Levels..... 40¢@10¢10¢
Diston's Plumbs and Levels..... 60¢@10¢
Diston's Pocket Levels..... 60¢@10¢
C. E. Jennings & Co.'s Iron, Adjust-
able..... 33¢
Stanley R. & L. Co..... 40¢
Stanley's Duplex..... 33¢
Woods' Extension..... 33¢

Poachers, Egg—
Buffalo Steam Egg Poachers, doz. 3,
No. 1, \$6.00; No. 2, \$9.00; No. 3,
\$9.00; No. 4, \$12.00..... 50¢

Points, Glaziers—
Bulk and 1-lb. papers..... 10¢ 10¢
1/4-lb. papers..... 10¢ 10¢
1/2-lb. papers..... 10¢ 10¢

Pokes, Animal—
Ft. Madison Hawkeye..... doz. \$3.25
Ft. Madison Western..... doz. \$4.00

Police Goods—
Manufacturers' Lists..... 25¢@35¢
Tower's..... 25¢

Polish—Metal, Etc—
Glasbrite, No. 2, 5 lb can (powder),
each, \$1.25; doz., \$12.00; No. 2, 10 lb
can (cake), each, \$2.50; doz., \$24.00.
Prestoline Liquid, No. 1 (1/2 pt.),
doz., \$3.00; No. 2 (1 qu.), \$9.00, 40¢
Prestoline Paste..... 40¢
George William Hoffman:
U. S. Metal Polish Paste, 3 oz.
boxes, doz. 50¢; gro. \$4.50;
1 lb boxes, doz. \$1.25; 1 lb
boxes, doz. \$2.25.
U. S. Liquid, 8 oz. cans, doz.,
\$1.25.
Barkeepers' Friend Metal Polish, doz.,
\$1.75.

Stove—
Black Eagle Benzine Paste, 5 lb cans,
each, \$1.25; doz., \$12.00; No. 2, 10 lb
Black Eagle, Liquid, 1/2 pt. cans,
doz. 75¢
Black Jack Paste, 1/2 lb cans, gr. \$9.00
Joseph Dixon's, doz. \$5.75..... 10¢
Dixon's Plumbago, doz. \$1.85
Fireside..... doz. \$2.50
Gem, gr. \$4.50..... 10¢
Japanese..... gr. \$3.50
Jet Black..... gr. \$3.50
Peerless Iron Enamel, 10 oz. cans,
doz. \$1.50
Wynn's Black Silk:
Paste, cans, doz. 5 oz., \$0.75;
1 lb, \$1.00; 1 lb, \$1.75
Paste, 5 lb can..... \$0.70
Liquid, cans, doz. 6 oz., \$0.75;
1/2 pt., \$1.00; 1 pt., \$1.75
Steel Range Enamel, doz., 1/2 pt.,
\$1.00; 1/2 pt., \$1.25.

Poppers, Corn—
1 qt. Square, doz. \$0.80; gro. \$8.00
1 qt. Round, doz. \$0.90; gro. \$9.00
1/2 qt. Square, doz. \$1.00; gro. \$10.00
2 qt. Square, doz. \$1.20; gro. \$12.00

**Post Hole and Tree Au-
gers and Diggers—**
See also Diggers, Post Hole, etc.

Posts, Steel—
Steel Fence Posts, each, 5 ft., 4¢;
6 ft., 4¢; 6 1/2 ft., 4¢.
Steel Hitching Posts..... each \$1.30

Potato Parers—
See Parers, Potato.

Pots, Glue—
Enameled..... 35¢@10¢
Tinned..... 30¢@10¢

Powder—
In Canisters:
Duck, 1 lb..... each 45¢
Fine Sporting, 1 lb..... each 75¢
Rifle, 1/2 lb..... each 15¢
Rifle, 1-lb..... each 25¢

In Kegs:
12 1/2-lb. kegs..... \$3.50
25-lb. kegs..... \$4.50
King's Semi-Smokeless:
Reg. (25 lb bulk)..... \$6.50
Half Keg (12 1/2 lb bulk)..... \$3.50
Quarter Keg (6 1/4 lb bulk)..... \$1.90
Case 24 (1 lb cans bulk)..... \$4.50
Half case (1 lb cans bulk)..... \$4.50
King's Smokeless: Shot Gun, Rifle,
Reg. (25 lb bulk)..... \$12.00 \$15.00
Half Keg (12 1/2 lb bulk)..... 4.25 7.75
Quarter Keg (6 1/4 lb bulk)..... 3.25 4.00
Case 24 (1 lb cans bulk)..... 14.00 17.00
Half case 12 (1 lb c. bk.)..... 7.25 9.75
Robin Hood Sm'less Shot Gun..... 50¢@20¢

Presses—
Fruit and Jelly—
Enterprise Mfg. Co..... 30¢@25¢

Seal Presses—
Morrill's No. 1, doz., \$20.00..... 50¢

Pruning Hooks and Shears
See Shears.

Pullers, Nail—
Cyclops..... 50¢
Miller's Falls, No. 3, doz., \$12.00;
\$20.00..... 33¢@10¢
Morrill's No. 1, Nail Puller, doz.
\$20.00..... 50¢
Pearson No. 1, Cyclone Spike Puller,
each \$30.00..... 50¢
Scranton, Case Lots:
No. 2B (large)..... \$5.50
No. 3B (small)..... \$5.00
Smith & Hemenway Co.:
Diamond B, case lots, doz., Large,
\$9.00; Small, \$7.50.
Giant No. 1, doz., \$18; No. 1 1/2,
\$16.50; No. 3, \$15..... 33¢
Staple Pullers, Utica and Davi-
son..... 60¢
Parrot Tack and Stub Puller, doz.,
75¢; gro. \$6.00

Pulleys, Single Wheel—
Inch..... 1/4 1/2 3 5
Avening or Tackle,
doz. \$0.30 .45 .60 1.05
Hay Fork, Sicivel or Solid Eye,
doz., 4 in., \$1.25; 5 in., \$1.55
Inch..... 2 1/2 3 1/2 4 1/2
Hot House, doz., \$0.65 .85 1.20
Inch..... 1/4 1/2 1 1/2 2 1/2 3
Screw, doz., \$0.16 .19 .23 .30
Inch..... 1/4 1/2 1 1/2 2 1/2 3
Side, doz., \$0.85 .10 .55 .60
Inch..... 1/4 1/2 1 1/2 2 1/2 3
Stowell's:
Ceiling or End, Anti-Friction, 60¢@10¢
Dumb Waiter, Anti-Friction, 60¢@10¢
Electric Light..... 60¢
Side, Anti-Friction, 60¢@10¢

Sash Pulleys—
Common Frame; Square or
Round End, per doz, 1 1/4 and
2 in..... 10¢@10¢
Auger Mortise, no Face Plate,
per doz, 1 1/4 and 2 in..... 10¢@10¢
Acme..... 1 1/4 in., 16¢; 2 in., 19¢
Fox-All-Steel, Nos. 3 and 1, 2 in.....
doz. 50¢

Grand Rapids All Steel Noiseless..... 50¢
Ideal..... 70¢@5¢
Niagara..... 1 1/4 in., 16¢; 2 in., 19¢
No. 26, Troy, 1 1/4 in., 14¢; 2 in., 16¢
Star..... 1 1/4 in., 16¢; 2 in., 19¢
Tackle Blocks—See Blocks.

Pumps—
Cistern..... 60¢
Pitcher Spout..... 75¢@75¢10¢
Wood Pumps, Tubing, etc. 45¢@50¢
Barnes Dbl. Acting (low list) 40¢@10¢
Barnes Pitcher Spout..... 75¢@10¢
Contractors' Rubber Diaphragm No.
2, B. & L. Block Co..... \$16.00
Day Spray Pump..... doz. \$6.50
Flint & Walling's Fast Mail Hand,
(low list)..... 55¢
Flint & Walling's Fast Mail (low
list)..... 55¢
Flint & Walling's Tight Top Pitcher.....
75¢@10¢5¢
National Specialty Mfg. Co., Measur-
ing, Nos. 2, \$6.00; 3, \$5.50..... 30¢
Myers' Pumps (low list)..... 50¢
Myers' Power Pumps..... 50¢
Myers' Spray Pumps..... 50¢

Pump Leathers—
Plunger and Lower Valve—Per
gro.:
Inch..... 2 1/2 2 1/2 2 1/2 2 1/2
Inch..... 3 3 1/4 3 1/4 3 1/4 3 1/4
Inch..... 3.30 3.60 3.85 4.10 4.40
Plunger Cup Leathers—Per 100:
Inch..... 2 1/2 3 3 1/4 4
Inch..... 2.75 3.85 6.00 6.00

Punches—
Saddlers' or Drive, good.....
doz. 50¢@75¢
Spring, single tube, good qual-
ity..... 1.75¢@2.00
Revolving (4 tubes).....
doz. \$3.50@3.75
Remis & Call Co.'s Cast St'l Drive.....
Morrill's Nos. 1AA, 1A, 1B, 1C,
\$15.00..... 50¢
Hercules, 1 dia, each \$5.00..... 50¢
Niagara Hollow Punches..... 40¢
Niagara Solid Punches..... 55¢@10¢
Wm. Schollhorn Co.:
Belt and Ticker, Bernard, 33 1/4%;
Paragon, 50%; Lodi..... 50¢
Timmers' Hollow P., S. & W. Co. 33 1/4%
Timmers' Solid P., S. & W. Co.,
doz., \$1.44..... 50¢

Rail—Barn Door, &c.—
Sliding Door, Painted Iron.....
2 1/4¢@3 1/4¢
Sliding Door, Wrought Brass,
1 1/4 in., lb., 36¢..... 30¢
Allich Mfg. Co.: Reliable Hanger
Track..... 50¢
Crunk's:
Double Braced Steel Rail, 1/2 ft. 3 1/4¢
O. N. T. Rail..... 3¢
Hinge Rail..... 39¢
Griffin's:
xxx, 100 ft., 1 x 3-16 in., \$3.00;
1 1/4 x 3-16 in., 3.50.
Hinged Hanger, 100 ft., 1 x 3-16
in., \$3.10; 1 1/4 x 3-16 in., \$3.80.
Lane's:
Hinged Track, 100 ft., 1 in., \$3.40;
1 1/4 in., \$3.96.
O. N. T., 100 ft., 1 in., \$3.00; 1 1/4
in., \$3.60; 1 1/2 in., \$4.00.
Lawrence Bros.:
100 ft. No. 201, \$4.00; No. 202, \$4.00
New York, 1 x 3-16 in., 100 ft. \$3.00
McKinney's:
Hinged Hanger Rail, 1/2 ft. 11¢..... 50¢
Nash Better..... 1/2 ft. 3 1/4¢
Standard, 1/2 in., 1/2 ft. No. 1, 4¢
Myers' Stayon Track..... 60¢@10¢
Richards' Mfg. Co.:
Common, 1 x 3-6 in., \$3.00; 1 1/4 x
3-16, \$3.25; 1 1/4 x 3-16, \$3.50.
Special Hinged Hanger Rail..... 60¢@10¢
Lam Screw Rail, No. 60..... 50¢
Gauge Trolley Track, 1/2 ft. No. 31,
9¢; No. 32, 14¢; No. 33, 20¢.
No. 50..... 60¢@10¢
Nos. 61, \$3.00; 62, \$3.25; 63, \$3.50; 64,
\$4.00; 45, \$3.25; 46, \$3.80; 49, No. 1,
\$3.25; 49, No. 2, \$3.50.
Stowell's:
Cast Rail..... 1/2 ft. 2 1/4¢
Steel Rail, Plain..... 25¢
Wrought Bracket, 1 3-16 in., 1/2 ft. 3¢
Wrought Bracket, 1 1/2 x 5-16, 1/2 ft. 7¢
Swett's Hylo, 1/2 ft. 11¢
No. 0, 1 x 3-16..... 100 ft. \$3.00
No. 1, 1 x 3-16..... 100 ft. \$3.00

Rakes—
NOTE.—Many goods are sold
at net prices.
Fort Madison Red Head Lawn..... \$3.25
Fort Madison Blue Head Lawn..... \$2.70
Jackson Lawn, 20 and 30 teeth, per
doz., net..... \$4.25
Cronk's:
New Champion Garden, doz. 12,
teeth, \$15.00; 14, \$16.50; 16, \$18.00..... 75¢
Victor Garden, doz. 12 teeth,
\$15.00; 14, \$16.50; 16, \$18.00..... 80¢
Queen City Lawn, doz., 20 teeth,
\$25.50; 24, \$30.00..... 100¢
Anticlog Lawn, doz..... 100¢
Malleable Garden..... 70¢@10¢
Ideal Steel Garden, doz. 12 teeth,
\$15.00; 14, \$16.00; 16, \$18.00..... 80¢
Kohler's:
Lawn Queen, 20-tooth..... doz. \$2.30
Lawn Queen, 24-tooth..... doz. \$3.00
Paragon, 20-tooth..... doz. \$2.70
Paragon, 24-tooth..... doz. \$2.75
Steel Garden, 14-tooth..... doz. \$2.40
Malleable Garden, 14-tooth, doz.,
\$1.70¢@2.00

Rasps, Horse—
Diston's..... 75¢
Heller Bros..... 70¢@5¢@10¢5¢
Liverlight Bros' Gold Medal 70¢@10¢75¢
New Nicholson..... 70¢@10¢75¢
See also Files.

Razors—
Liana Bar-ra-ic..... 60¢
Fox Razors, per doz., No. 42, \$20.00;
No. 41, \$20.00; No. 43, Platina..... 50¢
\$25.00
Red Devil..... 50¢

Silberstein:
Carbo Magnetic, \$21.00; Griffon, No.
65, \$13.50; Griffon, No. 00, \$12.00;
all other Razors, 40%.

Safety Razors—
Kampfe Bros.:
Star Safety, 25%; Star Interchange-
able, 25%; Star Safety Corn, 25%
Silberstein..... 40%

Reels, Fishing—
Hendryx:
M 6, Q 6, A 6, B 6, M 9 1/4, M 16,
Q 16, A 16, B 16, 4008, Rubber,
Populo, Nickered Populo..... 20¢
Aluminum, German Silv., Bronze, 25¢
1240 N, 124 N..... 20¢
3001 N, 66 N, 6 RM, G 9..... 25¢
4 N, 16 PN, 21 N, 26 PN..... 20¢
2904 P, 33 1/2, 2904 PN, 33 1/2, 0924 N,
33 1/2, 02084 N, 33 1/2, 02094 PN,
33 1/2, 802 N, 33 1/2
986 PN, 2904 N, 974 PN..... 25¢
5009 PN, 5009 N..... 20¢
Competitor, 102 P, 102 PN, 202 P,
202 PN, 102 PR, 202 PR..... 20¢
304 P, 304 PN, 03304 P, 03304 PN, 33 1/2

Registers—List July 1, 1903.
Japanned, Electroplated and
Bronzed..... 65¢@66¢@10¢
White Porcelain Enamel..... 60¢
Solid Brass or Bronze Metal.....
40¢@10¢

Revolvers—
Single Action..... 95¢@1.00
Double Action, except 44 cal. \$1.85
Double Action, 44 caliber..... \$2.00
Automatic..... 35¢
Hammerless..... 35¢

Riddles, Hardware Grade
16 in..... per doz. \$2.50@2.75
17 in..... per doz. \$2.75@3.00
18 in..... per doz. \$3.00@3.25

Rings and Ringers—
Bull Rings—
Steel..... \$0.70 0.75 0.80 doz.
Copper..... \$1.00 1.15 1.40 doz.
Rea's Improved Self-Piercing, doz.,
Cronk, 2 in., \$1.25; 2 1/2 in., \$1.50;
3 in., \$1.75.
Hog Rings and Ringers—
Hill's Rings, gro. boxes \$4.00@4.50
Hill's Ringers, Gray Iron.....
doz. 50¢@55¢
Hill's Ringers, Malleable Iron.....
doz. 70¢@75¢
Blair's Rings..... per gro. \$4.75@5.25
Blair's Ringers..... per doz. \$0.60@.63
Brown's Rings..... per gro. \$5.00@5.50
Brown's Ringers, per doz. \$0.60@.65

Rivets and Burrs—
Copper..... 33 1/4%
Carriage, Coopers', Tinner's, etc.:
Black..... 70¢@10¢
Metallic Tinned..... 70¢
Bifurcated and Tubular—
Assorted in Boxes.
Bifurcated, per doz. boxes, paste-
board boxes, 25¢@25¢; Tin boxes,
29¢@32¢.
Tubular, per doz. boxes, 50 count,
72¢; 100 count, 51¢@58¢.

Rollers—
Acme, Stowell's Anti-Friction..... 50¢
Cronk's Stay No. 65, \$9.00; No.
50..... \$1.00
Cronk's Brinkerhoff No. 55, \$9.00;
No. 56..... \$0.94
Lane's Stay..... 40¢
Richards' Stay:
Handy Adj. and Reversible No. 53.75¢
O. K. Adj. and Reversible No. 56.50¢
Lag screw, Nos. 55 and 57..... 50¢
Underwriters', Nos. 59, 60..... 50¢
Favorite, No. 54..... 60¢
Stowell's Barn Door Stay, 1/2 doz. \$1.00
Swett's Anti-Friction..... 50¢
Screw and Spike Stay..... 60¢
Hinge Adjustable Stay..... doz. 90¢

Rope—
Manila, 7-16 in. diam. and larger:
Pure..... lb., 12 1/2¢@13¢
Sisal, 7-16 in. diam. and larger:
Pure..... lb., 9 1/4¢
Sisal, 7-16 in. diam. and larger:
No. 2 quality..... lb., 7 1/4¢@8¢
Sisal, Ray, Hide and Bale
Ropes, Medium and Coarse:
Mixed..... lb., 7 1/4¢@8¢
Pure..... lb., 9 1/4¢
Sisal, Tarred, Medium Lath
Yarn, Coarse and Untarred:
Mixed..... lb., 7 1/4¢@8¢
Pure..... lb., 8¢
Cotton Rope:
Best, 1/4-in. and larger..... 17¢@18¢
Medium, 1/4-in. and larger..... 16¢@17¢
Common, 1/4-in. and larger..... 10¢
In coils, 1/4¢ advance.

Jute Rope:
Thread, No. 1, 1/4-in. & up, lb., 9¢
Thread, No. 2, 1/4-in. & up, lb., 8 1/2¢
Old Colony Manila Transmission
Rope..... lb. 17 1/2¢

Wire Rope—
Galvanized..... 37 1/4¢@41 1/4¢
Plain..... 45¢@52 1/2¢

Ropes, Hammock—
Covert Mfg. Co.:
Jute, 35%; Sisal..... 20%

Rules
Boxwood..... 60¢@60¢10¢
Ivory..... 35¢@10¢@10¢5¢
Chapin-Stephens Co.:
Boxwood..... 60¢
Flexfold..... 27 1/4¢@10¢10¢
Ivory..... 35¢@10¢10¢
Miscellaneous..... 50¢@50¢10¢10¢
Stephens' Combination..... 55¢@55¢10¢
Stationers'..... 10¢@10¢10¢

Kaufel & Esser Co.:	35.40%
Folding, Wood.....	35.40%
Folding, Steel.....	35.40%
Lufkin's Steel.....	50.10%
Lufkin's Lumber.....	60%
Stanley & L. Co.:	60%
Boxwood.....	60%
Ivory.....	45%
Miscellaneous.....	60%
Zig Zag.....	40%
Zig Zag, Pin Joint.....	42%
Upton Nut Co.:	60%
Boxwood.....	60%
Ivory.....	45%

Sash Balances—

See Balance, Sash.

Sash Locks—

See Locks, Sash.

Sash Weights—

See Weights, Sash.

Sausage Stuffers or Fillers—

See Stuffers or Fillers, Sausage.

Saw Frames—

See Frames, Saw.

Saw Sets—See Sets, Saw.**Saw Tools—See Tools, Saw.****Saws—**

Atkins:	45%
Circular.....	45%
Band.....	50.50%
Butcher Saws.....	45%
Cross Cuts.....	45%
One-Man Cross Cuts.....	45%
Narrow Cross Cuts.....	45%
Hand, Rip and Panel.....	45%
Miter Box and Compass.....	45%
Mulay, Mill and Drag.....	45%
Chapin-Stephens Co.:	45%
Turning Saws and Frames.....	45%
Diamond Saw and Stamping Works:	45%
Sterling Kitchen Saws.....	45%
Diaston's:	45%
Circular, Solid and Ins'ted Tooth.....	45%
Band, 2 to 18 in. wide.....	45%
Hand, 1/4 to 1 1/2.....	45%
Crosscuts.....	45%
Narrow Crosscuts.....	45%
Mulay, Mill and Drag.....	45%
Framed Woodsaws.....	45%
Woodsaw Blades.....	45%
Woodsaw Rods, Tinned.....	45%
Hand Saws, Nos. 12, 99, 9, 16, 4190.....	45%
Hand Saws, Nos. 7, 107, 107 1/2.....	45%
0, 00, Combination.....	45%
Compass, Key Hole, &c.....	45%
Butcher Saws and Blades.....	45%
C. E. Jennings & Co.'s:	45%
Back Saws.....	45%
Butcher Saws.....	45%
Compass and Key Hole Saws.....	45%
Framed Wood Saws.....	45%
Hand Saws.....	45%
Wood Saw Blades.....	45%
Millers Falls:	45%
Butcher Saws.....	45%
Star Saw Blades.....	45%
Massachusetts Saw Works:	45%
Victor Kitchen Saws.....	45%
Butcher Saws and Blades.....	45%
Peace & Richardson's Hand Saws.....	45%
Simonds:	45%
Circular Saws.....	45%
Crescent Ground Cross Cut Saws.....	45%
One-Man Cross Cuts.....	45%
Gang Mill, Mulay and Drag Saws.....	45%
Hand Saws.....	45%
Back Saws.....	45%
Butcher Saws.....	45%
Hand Saws.....	45%
Hand Saws, Bay State Brand.....	45%
Compass, Key Hole, &c.....	45%
Wood Saws.....	45%
Wheeler, Madden & Clemson Mfg. Co.'s Cross Cut Saws.....	45%

Hack Saw Blades and Frames—

Atkins' Hack Saw Blades A A A.....	25%
Diaston's:	25%
Concave Blades.....	25%
Keystone Blades.....	25%
Hack Saw Frames.....	25%
Simonds File Co.....	25%
C. E. Jennings & Co.'s:	25%
Hack Saw Frames, Nos. 175, 180.....	25%
Hack Saws, Nos. 175, 180, complete.....	25%
Goodell's Hack Saw Blades.....	25%
Griffin's Hack Saw Frames.....	25%
Griffin's Hack Saw Blades.....	25%
Star Hack Saws and Blades.....	25%
Sterling Hack Saw Blades.....	25%
Sterling Hack Saw Frames.....	25%
Sterling Power Hack Saw Machines.....	25%
each, No. 1, \$25.00; No. 2, \$30.00.....	25%
Victor Hack Saw Blades.....	25%
Victor Hack Saw Frames.....	25%

Scroll—

Barnes, No. 7, \$15.....	25%
Barnes' Scroll Saw Blades.....	25%
Barnes' Velocipede Power Scroll Saw.....	25%
without boring attachment.....	25%
Lester, complete, \$19.00.....	25%
Rogers, complete, \$3.50 and \$4.00.....	25%

Scales—

Family, Turnbull's..... 50.50.10%

Counter:

Hatch, Platform, 1/4 os. to 5 lbs..... 50.50.10%

Two Platforms, 1/4 os. to 8 lbs..... 50.50.10%

Union Platform, Plain..... 50.50.10%

Union Platform, Std..... 50.50.10%

Chatillon's:

Favorite..... 50.50.10%

Crocker's Trip Scales..... 50.50.10%

Chicago Scale Co.:

The Little Detective..... 25.50.10%

Union or Family No. 2..... 25.50.10%

Portable Platform (reduced list)..... 25.50.10%

Stone or Steel (reduced list)..... 25.50.10%

The Standard R. B. and W..... 25.50.10%

The Standard R. B. and W..... 25.50.10%

Scrappers—

Box, 1 Handle..... 22.50.10%

Box, 2 Handle..... 22.50.10%

Ship..... Light, \$2.00; Heavy, \$1.50

Adjustable Box Scraper (S. R. & L. Co.), \$6.00.....	46%
Chapin-Stephens Co., Box.....	30.30.10%

Screws—Bench and Hand

Bench, Iron, doz., 1 in., \$2.50.....

2.75; 1 1/2, \$3.00; 3.25; 1 3/4, \$3.50; 3.75

Bench, Wood..... 20.20.10%

Hand, Wood..... 20.20.10%

R. Bliss Mfg. Co., Hand..... 20.20.10%

Chapin-Stephens Co., Hand..... 20.20.10%

Coach, Lag and Hand Rail—

Lag, Cone Point, list Oct. 1, '99..... 75.45%

Coach, Gimlet Point, list Oct. 1, '99..... 75.45%

Hand Rail, list Jan. 1, '81..... 70.45.75%

Jack Screws—

Standard List..... 75%

Millers Falls..... 50.50.10%

P. S. & W..... 50%

Swett Iron Works..... 75.80%

Machine—

List Jan. 1, '98:

Flat or Round Head, Iron..... 50.50.10%

Flat or Round Head, Brass..... 50.50.10%

Set and Cap—

Set (Iron)..... 75.45.75%

Set (Steel), net advance over Iron..... 25%

Sq. Hd. Cap..... 70.45.75%

Hex. Hd. Cap..... 70.45.75%

Rd. Hd. Cap..... 50.45.75%

Fillister Hd. Cap..... 60.45.75%

Wood—

List July 23, 1903:

Flat Head, Iron..... 87.45.50%

Round Head, Iron..... 85.45.50%

Flat Head, Brass..... 82.45.50%

Round Head, Brass..... 80.45.50%

Flat Head, Bronze..... 77.45.50%

Round Head, Bronze..... 75.45.50%

Drive Screws..... 87.45.50%

Scroll Saws—

See Saws, Scroll.

Scythes—

Per doz.

Grass, No. 1, Plain..... \$6.25 @ \$6.75

Clipper, Bronzed Webb..... \$6.50 @ \$7.00

No. 3 Clipper, Pol'd Webb..... \$6.75 @ \$7.25

No. 6 Clipper and Solid Steel..... \$7.00 @ \$7.50

Bush, Weed and Bramble, No. 2..... \$6.50 @ \$7.00

Grain, No. 1..... \$6.25 @ \$6.75

Bronzed Webb, No. 1..... \$6.50 @ \$7.00

Nos. 3 and 4 Clipper, Grain..... \$6.75 @ \$7.25

Solid Steel, No. 6..... \$9.25 @ \$9.75

Seeders, Raisin—

Enterprise..... 25.30%

Sets—Awl and Tool—

Fray's Adj. Tool Handles, Nos. 1, \$12; 2, \$18; 3, \$12; 4, \$9; 5, \$7..... 50%

C. E. Jennings & Co.'s Model Tool Holders..... 30%

Millers Falls Adj. Tool Handles, No. 1, \$12; No. 4, \$12; 5, \$18..... 15.10%

Garden Tool Sets

Ft. Madison Three Plows, Hoe, Rake and Shovel..... 30 doz sets \$9.00

Sets, Nail—

Octagon..... 30 doz sets \$5.75

Buck Bros..... 27.4%

Cannon's Diamond Point..... 30 doz \$12.40

Mayhew's..... 30 doz \$9.90

Snell's Corrugated, Cup Pt..... 30 doz \$7.20

Snell's Knurled, Cup Pt..... 30 doz \$7.20

Victor Knurled, Cup Pt..... 30 doz \$7.50

Rivet—

Regular list..... 75.75.10%

Saw—

Atkins:

Criterion..... 40%

Adjustable..... 40%

Diaston's Star, Monarch and Triumph..... 30%

Morrill's No. 1..... \$15.00

No. 3 and 4, Cross Cut..... \$20.00

No. 5, Mill..... \$30.00

No. 10, 11, 85..... \$15.00

No. 1 Old Style..... \$10.00

Special..... \$16.25

Giant Royal Cross Cut..... 30 doz \$8.00

Royal, Hand..... 30 doz \$4.90

Taintor Positive..... 30 doz \$6.75

Shaving—

Fox Shaving Sets, No. 30..... 30 doz \$24.00

Smith & Hemenway Co.'s..... 60%

Sharpeners, Knife—

Chicago Wheel & Mfg. Co..... 70%

Pike Mfg. Co.:

Fast Cut Pocket Knife Hones..... 1.50

Mounted Kitchen Sand Stone..... 1.50

Natural Grit Carving Knife..... 3.00

Quick Cut Emery Carving Knife Hones..... 1.50

Quick Edge Pocket Knife Hones..... 2.00

Skate—

Smith & Hemenway Co., Eureka..... 20%

Shaves, Spoke—

Iron..... 20.20.10%

Wood..... 20.20.10%

Razor Edge (Stanley R. & L. Co.)..... 45%

Iron, 50%: Wood..... 35%

Chapin-Stephens Co..... 30.30.10%

Goodell's..... 20.20.10%

Wood's F1 and F2..... 50%

Shears—

Cast Iron..... 7. 8. 9 in.

Best..... \$16.00 18.00 20.00 gro.

Good..... \$13.00 15.00 17.00 gro.

Cheap..... \$5.00 6.00 7.00 gro.

Straight Trimmers, &c.....

Best quality, Jap..... 70.70.10%

Best quality, Nickel..... 60.60.10%

Fair quality, Jap..... 80.80.10%

Fair quality, Nickel..... 75.75.10%

Tailors' Shears.....	40.40.10%
Acme Cast Shears.....	40.40.10%
Heinisch's Tailors' Shears.....	40.40.10%
Wilkinson Shear & Cutlery Co.:	40.40.10%
Sheep, 1900 list.....	30.10.5%
Grass.....	50.45.10%
Horse or Mule.....	50.45.10%

Tinners' Snips—

Steel Blades..... 20.45.10%

Steel Laid Blades..... 40.40.10%

Forged Handles, Steel Blades, Berlin..... 50%

Heinisch's Snips..... 40%

Jennings & Griffin Mfg. Co.'s, 6 1/2 to 10 in..... 50%

Niagara Snips..... 40%

P. S. & W. Forged Handles..... 20%

Pruning Shears—

Cronk's Hand Shears..... 33.4%

Cronk's Wood Handle Shears..... 33.4%

Disston's Combined Pruning Hook and Saw..... 25%

Disston's Pruning Hook only, 9 doz..... \$12.00

John T. Henry Mfg. Co.:

Pruning Shears, all grades..... 50%

P. S. & W. Co..... 30%

Wilkinson Shear & Cutlery Co.:

Hedge, Wilcutt Brand..... 60.45.10%

Lawn and Border, Wilcutt Brand..... 60.45.10%

Sheaves—Sliding Door—

Stowell's Anti-Friction..... 50%

Reading..... 40%

R. & E. list..... 40%

Wrightsville Hatfield Pattern..... 30%

Sliding Shutter—

Reading list..... 40%

R. & E. list..... 10%

Shells—Shells, Empty—

Brass Shells, Empty:

Climax, 10 and 12 gauge..... 65.45.10%

Club, Rival, 65.45.10%

First Quality..... 60.45.10%

Paper Shells, Empty:

New Rapid, 10, 12, 16 and 20 gauge..... 25.45.10%

Climax, 10 and 12 gauge; Acme, 10, 12, 16 and 20 gauge; Ideal, 10, 12, 16 and 20 gauge; Leader grade..... 25.45.10%

Union, League, 12 and 12 gauge..... 25.45.10%

Rival Grade..... 25.45.10%

New Climax, Deafness, 10, 12, 14, 16 and 20 gauge; Climax, 14, 16 and 20 gauge..... 20.45.10%

Challenge, Monarch, 10, 12, 14 and 20 gauge; Repeater Grade..... 20.45.10%

Expert, 10, 12, 16 and 20 gauge..... 33.45.10%

Robin Hood, Low Brass..... 20.45.10%

Robin Hood, High Brass..... 30.45.10%

Indian, for Black Powder..... 25.45.10%

Shells, Loaded—

Loaded with Black Powder..... 40%

Loaded with Smokeless Powder..... 40.45.10%

medium grade..... 40.45.10%

Loaded with Smokeless Powder..... 40.45.10%

high grade..... 40.45.10%

Robin Hood:

Smokeless Robin Hood, Low Brass..... 30%

Smokeless Comets, High Brass..... 30.45.10%

Indian, Black Powder..... 40.45.10%

Winchester:

Smokeless Repeater Grade..... 40.45.10%

Smokeless Leader Grade..... 40.45.10%

Black Powder..... 40%

Shingles, Metal—Per Sq.

Edwards Mfg. Co.:

Painted, Galv.

14 x 20..... \$4.25

10 x 14..... 4.50

7 x 10..... 4.75

Wheeling Corrugating Co.:

Tin Painted, Galv.

Dixie, 14 x 20 in..... \$4.25

Scythe Stones—

Chicago Wheel & Mfg. Co.:
Gem, 10 gro., 10 in., \$8.00; 12 in., \$10.80.
Norton Alundum Scythe Stones:
Less than 10 gross lots... \$4.00
Lots of 10 gross or more... \$4.50
Pike Mfg. Co., 1901 list:
Black Diamond S. S. 8 in. gro. \$12.00
Lamolle S. S. 8 in. gro. \$11.00
White Mountain S. S. 8 in. gro. \$9.00
Green Mountain S. S. 8 in. gro. \$9.00
Extra Indian Pond S. S. 8 in. gro. \$7.50
No. 1 Indian Pond S. S. 8 in. gro. \$7.00
No. 2 Indian Pond S. S. 8 in. gro. \$4.50
Leader Red End S. S. 8 in. gro. \$4.50
Quick Cut Emery... \$7.00
Pure Corundum... \$18.00
Crescent... \$7.00
Emery Scythe Rifles, 2 Coat, \$8
Emery Scythe Rifles, 3 Coat, \$10
Emery Scythe Rifles, 4 Coat, \$13
Balance of 1904 list 33 1/2 %

Stoppers, Bottle—

Victor Bottle Stoppers... \$4.00

Stops—Bench—

Millers Falls... \$15.10
Morrill's, No. 1, \$10.00... \$5.00
Morrill's, No. 2, \$12.50... \$5.00

Door—

Chapin-Stephens Co. \$40.00 to \$10.00

Plane—

Chapin-Stephens Co. \$20.00

Straps—Box—

Cary's Universal, case lots... \$34.10 to \$10.00

Stretchers, Carpet—

Cast Iron, Steel Points, doz. \$60.00 to \$10.00

Socket

Bullard, doz. \$12.00
Excelsior Stretcher and Tack Hammer Combined, doz. \$4.00 to \$2.00

Strops, Razor—

Star Diagonal Strop... \$25.00

Stuffers, Sausage—

Enterprise Mfg. Co. \$25.00 to \$7.50
National Specialty Co., list Jan. 1, 1902... \$5.00 to \$2.50

Sweepers, Carpet—

National Sweeper Co.:
Louis XV, Roller Bearing, Gold Plated... \$120.00
Hepplewhite, Roller Bearing, Silver Plated... \$72.00
Sheraton, Roller Bearing, N'kel... \$60.00
Ye Mission, Roller Bearing, Oxidized Coppered... \$36.00
Transparent, Roller Bearing, Plate Glass top, Nickel... \$36.00
National Queen, Roller Bearing, Fancy Veneers... \$42.00
Loyal, Roller Bearing... \$25.00
Triple Medal, Roller Bearing, Nickel... \$24.00
Marion, Roller Bearing, N'kel... \$24.00
Marion Queen, Roller Bearing, Nickel... \$24.00
Monarch, Roller Bearing, Jap... \$20.00
Perpetual, Regular B'rgs, N'kel... \$20.00
Perpetual, Regular B'rgs, Jap... \$18.00
Monarch Extra (17 in. case), Roller Bearing, Nickel... \$36.00
Monarch Extra (17 in. case), Roller Bearing, Japanned... \$36.00
Auditorium (25 in. case), Roller Bearing, Nickel... \$54.00
Mammoth (30 in. case), Roller Bearing, Nickel... \$80.00

NOTE—Rebates: 50c per dozen on three-dozen lots; \$1 per dozen on five-dozen lots; \$2 per dozen on ten-dozen lots; \$3.00 per dozen on twenty-five-dozen lots.**Streator Metal Stamping Co.:**

Eureka Japanned... \$15.00
Model A, Sanitary... \$25.00
Model A, Sterling... \$25.00
Model B, Sterling, Nickel... \$23.00
Model B, Sterling, Japanned... \$21.00
Model C, Sterling... \$21.00
Model D, Sterling... \$19.50

Tacks, Finishing Nails, &c.

New List, May 1, 1905.

American Carpet Tacks... \$9.00 to \$2.50
American Cut Tacks... \$9.00 to \$2.50
Suedes Cut Tacks... \$9.00 to \$2.50
Suedes Upholsterers... \$9.00 to \$2.50
Gimp Tacks... \$9.00 to \$2.50
Lace Tacks... \$9.00 to \$2.50
Trimmers' Tacks... \$9.00 to \$2.50
Looking Glass Tacks... \$9.00 to \$2.50
Bill Posters' and Railroad Tacks... \$9.00 to \$2.50
Finishing Nails... \$9.00 to \$2.50
Trunk and Clout Nails... \$9.00 to \$2.50

NOTE—The above prices are for Standard Weights. An extra 5% is given on Medium Weights, and an extra 10% is given on Light weights.

Miscellaneous—

Double Pointed Tacks... \$9.00 to \$5.00

See also Nails, Wire.

Tanks, Oil—

Emerald, R. M. Co. \$30.00 to \$3.40
Emerald, R. M. Co. \$30.00 to \$3.40
Queen City, R. M. Co. \$30.00 to \$3.40
Queen City, R. M. Co. \$30.00 to \$3.40

Tapes, Measuring—

American Asses' Skin... \$5.00 to \$1.00
Patent Leather... \$5.00 to \$1.00
Steel... \$5.00 to \$1.00
Chesterman's... \$5.00 to \$1.00
Keuffel & Esser Co. \$40.00 to \$9.00
Favorite, Am Skin... \$40.00 to \$9.00
Favorite, Duck and Leather... \$40.00 to \$9.00
Metallic and Steel, lower list, \$30.00 to \$5.00; Pocket, \$30.00 to \$5.00
Lufkin's... \$40.00 to \$9.00
Asses' Skin... \$40.00 to \$9.00

Metallic... \$30.00 to \$5.00
Patent Bend, Leather... \$25.00 to \$5.00
Pocket... \$40.00 to \$5.00
Steel... \$30.00 to \$5.00

Wiebush & Hilger:
Chesterman's Metallic, No. 34L, etc. \$25.00 to \$5.00
Chesterman's Steel, No. 10381, etc. \$30.00 to \$5.00

Teeth, Harrow—

Steel Harrow Teeth, plain or headed, 1/2-inch and larger... per 100 lbs. \$2.75 to \$3.00

Thermometers—

Tin Case... \$8.00 to \$10.00 to \$10.00 to \$5.00

Ties, Sale—Steel Wire—

Single Loop... \$8.00 to \$10.00 to \$10.00 to \$5.00
Monitor, Cross Head, etc. \$6.00 to \$10.00 to \$10.00 to \$5.00

Brick Ties—

Niagara Brick Ties... \$2.50 to \$10.00

Tinners' Shears, &c.—

See Shears, Tinners', &c.

Tinware—

Stamped, Japanned and Pieced, sold very generally at net prices.

Tire Benders, Upsetters, &c.

See Benders and Upsetters, Tire.

Tools—Coopers'—

L. & I. J. White... \$20.00 to \$5.00

Hay—

Myers' Hay Tools... \$5.00
Stowell's Hay Carriers, 50%; Hay Forks, 50%; Fork Pulleys, 50%.

Miniature—

Smith & Hemenway Co.'s, Davidson... \$25.00

Saw—

Atkins' Cross Cut Saw Tools... \$35.00 to \$5.00
Simonds' Improved... \$35.00 to \$5.00
Simonds' Crescent... \$35.00 to \$5.00

Ship—

L. & I. J. White... \$25.00

Transom Lifters—

See Lifters, Transom.

Traps—Fly—

Balloon, Globe or Acme, doz. \$1.15 to \$1.25; gro. \$11.50 to \$12.00
Harper Champion or Paragon, doz. \$1.25 to \$1.40; gro. \$13.00 to \$13.50

Game—

Imitation Onoda... \$75.00 to \$5.00
Newhouse... \$45.00 to \$5.00
Hawley & Norton... \$65.00
Victor... \$70.00 to \$10.00
Onoda Community Jump... \$60.00

Mouse and Rat—

Mouse, Wood, Choker, doz. holes \$4.00 to \$9.00

Mouse, Round or Square Wire.

Marty French Rat and Mouse Traps (Genuine):
No. 1, Rat, 1/2 doz., \$12.25; case of 24... \$11.50 doz.
No. 3, Rat, 1/2 doz., \$6.50; case of 50... \$5.75 doz.
No. 3 1/2, Rat, 1/2 doz., \$5.25; case of 50... \$4.70 doz.
No. 4, Mouse, 1/2 doz., \$3.35; case of 150... \$3.00 doz.
No. 5, Mouse, 1/2 doz., \$3.00; case of 150... \$2.25 doz.

Trimmers, Spoke—

Wood's E 1... \$50.00

Trowels—

Diston Brick and Pointing... \$25.00
Diston Plastering... \$20.00
Diston "Standard Brand" and Garden Trowels... \$30.00
Kohler's Steel Garden Trowels, 1/2 gro., 5 in., \$4.50; 6 in., \$6.00.
Never-Break Steel Garden Trowels... \$4.00 gro. \$6.00

Trucks, Warehouse, &c.—

B. & L. Block Co.:
New York Pattern... \$50.00 to \$10.00
Western Pattern... \$50.00 to \$10.00
Handy Trucks... \$15.00
Grocery... \$15.00
Daisy Stove Trucks, Improved Pattern... \$18.50
McKinney Trucks... \$10.00
Model Store Trucks... \$18.50

Tubs, Wash—

M'Fgr's list, price per gross.
No. 1 2 3
Galvanized, 66, 76, 84, 96 104 5
Galvanized Wash Tubs (R. M. Co.):
No. 1 2 3 10 20 30
Per doz., net \$5.70 \$3.30 \$3.30 \$4.00 \$3.30 \$3.10

Twine, Miscellaneous—

Flax Twine:
No. 9, 1/2 and 1/4 lb. Balls, 23 to 25¢
No. 12, 1/2 and 1/4 lb. Balls, 21 to 22¢
No. 18, 1/2 and 1/4 lb. Balls, 18 to 19¢
No. 24, 1/2 and 1/4 lb. Balls, 17 to 19¢
No. 36, 1/2 and 1/4 lb. Balls, 16 to 18¢
Chalk Line, Cotton... \$10.00
Cotton Mops, 6, 9, 12 and 15 lb. to doz. \$11 to \$19¢
Cotton Wrapping, 5 Balls to lb., according to quality... \$15 to \$23¢
American 2-Ply Hemp, 1/2 and 1/4 lb. Balls... \$14 to \$15¢
American 3-Ply Hemp, 1-lb. Balls... \$15 to \$16¢
India 2-Ply Hemp, 1/2 and 1/4 lb. Balls (Spring Twine) \$10 to \$11¢
India 3-Ply Hemp, 1-lb. Balls... \$10 to \$11¢
India 3-Ply Hemp, 1 1/2-lb. Balls... \$10 to \$11¢
2, 3, 4 and 5-Ply Jute, 1/4 lb. Balls... \$13 to \$14¢
Mason Line, Linen, 1/4 lb. Bls. 47¢
No. 25, Mattress, 1/2 and 1/4 lb. Balls, according to quality... \$30 to \$60¢
Wool, 3 to 6 ply... B 9¢; A 10¢

Vises—

Solid Box... \$50.00 to \$10.00

Parallel—

Atthol Machine Co.:
Simpson's Adjustable... \$40.00
Standard... \$40.00
Amateur... \$25.00
Columbian Hdw. Co. \$40.00
Emmert Universal:
Pattern Makers' No. 1, \$15.00; No. 2, \$12.50.
Machinist and Tool Makers' No. 4A, \$12.50; No. 6A, \$10.00; No. 10A, \$22.50.
Presto Quick Acting Adjustable Jaw, 2 1/2 to 10 1/2; Solid Jaw... \$35 to \$54.10

Tiger Machinists'... \$40.00 to \$5.00
Fisher & Norris Double Screw, net, each, Nos. 2, \$10.50; 3, \$16.00; 4, \$23.50; 5, \$27.00.
Holland's... \$40.00 to \$5.00
Machinists'... \$40.00 to \$5.00
Keystone... \$65.00 to \$70.00
Lewis Tool Co.:
Adjustable Jaw... \$30.00
Monarch, 50%; Solid Jaw... \$50.00
Massey Vice Co.:
Glimcher... \$40.00
Perfect, 15%; Lightning Grip... \$15.00
Merrill's... \$20.00
Millers Falls Oval Slide Pattern... \$60.00 to \$10.00
Parker's:
Victor, 20 to 25%; Regulars... \$20 to \$25.00
Vulcan... \$40 to \$45.00
Combination Pipe... \$55 to \$60.00
Prentiss... \$20 to \$25.00
Snediker's X. L. \$33 to \$4.00
Stephens'... \$33 to \$4.00

Saw Filers—

Disston's D 3 Clamp and Guide, 1/2 doz., \$24.00, 3/4 doz., \$30.00.
Perfection Saw Clamps, 1/2 doz., \$4.50
Reading... \$60.00
Westworth's Rubber Jaw, Nos. 1, 2 and 3... \$50.00

Wood Workers—

Massey Vice Co.:
Lightning Grip, 15%; Perfect... \$15.00
Wyman & Gordon's Quick Action, 6 in., \$4.00; 9 in., \$7.00; 14 in., \$8.00.

Miscellaneous—

Holland's Combination Pipe... \$40.00 to \$5.00
Massey's Quick Action Pipe... \$40.00
Parker's Combination Pipe:
87 Series, 60%; 187 Series, 60.5%; No. 870, 60%.

Wads—Price per M.

B. E., 11 up... \$60¢
B. E., 9 and 10... \$70¢
B. E., 8... \$80¢
B. E., 7... \$80¢
P. E., 11 up... \$1.00
P. E., 9 and 10... \$1.25
P. E., 8... \$1.50
P. E., 7... \$1.50
Ely's B. E., 11 and larger \$1.70 to \$1.75
Ely's B. E., 12 to 20... \$3.00 to \$3.25

Ware, Hollow—

Cast Iron, Hollow—

Stove Hollow Ware:

Enameled... \$45 to \$10¢
Ground... \$50 to \$5¢
Plain or Unground... \$60¢
Country Hollow Ware, per 100 lbs. \$3.00

White Enameled Ware:

Melita Kettles... \$65 to \$10¢
Covered Ware:
Tinned and Turned... \$35 to \$10¢
Enameled... \$45 to \$10¢
See also Pots, Glue.

Enameled—

Agate Nickel Steel Ware... \$60¢
Iron Clad Ware... \$70 to \$10¢
Lava, Enameled... \$40 to \$10¢
Never Break Enameled... \$50¢

Tea Kettles—

Galvanized Tea Kettles:
Inch... 6 7 8 9
Each... \$4 50¢ 55¢ 65¢

Steel Hollow Ware—

Avery Spiders and Griddles... \$65 to \$5¢
Avery Kettles... \$60¢
Porcelain... \$50 to \$50¢
Never Break Spiders and Griddles... \$60¢
Never Break Kettles... \$60¢
Solid Steel Spiders and Griddles... \$65 to \$5¢
Solid Steel Kettles... \$60¢

Warmers, Foot—

Pike Mfg. Co., Soapstone... \$40.00 to \$10.00

Washboards—

Solid Zinc:
Crescent, family size, bent frame... \$3.70
Red Star, family size, stationary protector... \$3.70
Double Zinc Surface:
Saginaw Globe, family size, stationary protector... \$3.25
Cable Cross, family size, stationary protector... \$3.40
Single Zinc Surface:
Naiad, family size, open back, perforated... \$2.90
Single Saginaw Globe... \$2.75
Brass Surface:
Brass King, Single Surface, open back... \$3.65
Nickel Plate Surface:
No. 1001 Nickel Plate, Single Surface... \$3.65
Glass Surface:
Glass King, Single Surface, open back... \$3.65
Enamel Surface:
Enamel King, Single Surface, ventilated back... \$3.65

Washers—Leather, Axle—

Solid... \$60 to \$10 to \$80 to \$10 to \$10¢
Patent... \$90 to \$90¢
Coll: 1/4 1 1 1/4 1 1/4 Inch.
10¢ 11¢ 12¢ 14¢ per doz

Iron or Steel—

Size bolt... 5-16 3/8 1/2 5/8 3/4
Washers... \$5.60 4.70 3.40 3.20 3.00
The above prices are based on \$5.80 off list.

In lots less than one keg add 1/4¢ per lb.; 5-lb. boxes add 1/4¢ to list.

Cast Washers—

Over 1/2 inch, barrel lots... per lb. 1 1/4 to 2¢

Weather Strip—

Flexible Felt—
Lined, per 100 ft. \$2; \$3; \$4... \$4 to \$10¢
Moore's Unlined, per 100 ft. \$2; \$3; \$4... \$4 to \$10¢

Wedges—

Oil Finish... lb. 2.70 to 2.80¢

Weights—Hitching—

Covert Mfg. Co. \$30.00 to \$2.00

Sash—

Per ton, f.o.b. factory:
Eastern District... \$30.00
Southern Territory... \$23.00 to \$24.00
Western and Central Districts... \$22.00 to \$23.00

Wheels, Well—

8-in., \$1.55; 10-in., \$2.00; 12-in., \$2.50; 14-in., \$4.00.

Wire and Wire Goods—

Bright and Annealed:
6 to 9... \$80¢
10 to 18... \$80 to \$75¢
19 to 26... \$80 to \$75¢
27 to 36... \$80 to \$75¢
Galvanized:
6 to 9... \$75 to \$70¢
10 to 14... \$75 to \$70¢
15 to 18... \$75 to \$70¢
19 to 26... \$75 to \$70¢
27 to 36... \$75 to \$70¢
Coppered:
6 to 9... \$75 to \$70¢
10 to 14... \$75 to \$70¢
15 to 18... \$75 to \$70¢
19 to 26... \$75 to \$70¢
27 to 36... \$75 to \$70¢
Tinned:
6 to 14... \$75 to \$70¢
15 to 18... \$75 to \$70¢
Brass... \$2 1/2¢ lb., base
Copper... \$3 1/2¢ lb., base
Cast Steel Wire... \$50¢

Spooled Wire—

Annealed and Tinned, 70¢ to \$1.00 to \$1.10 to \$1.20
Brass and Copper... \$1.00 to \$1.10 to \$1.20
Retailers' Assortments, per box... \$2.25 to \$2.50

Wire Clothes Line, see Lines.
Wire Picture Cord, see Cord.

Bright Wire Goods—

Steel Wire Goods... \$90 to \$10¢
Brass Wire Goods... \$85 to \$80¢
Brass Cup and Shoulder Hooks... \$80 to \$15¢

Wire Cloth and Netting—

Galvanized Wire Netting... \$80 to \$75¢
Painted Screen Cloth, 100 ft., \$1.30
Standard Gave Hardware Grade:
Nos. 2, 2 1/2 & 3 Mesh, sq. ft. 3 1/4¢
Nos. 4 and 5 Mesh, sq. ft. 3 1/4¢
No. 6 Mesh, sq. ft. 3 1/4¢
No. 8 Mesh, sq. ft. 3 1/4¢

Wire, Barb—See Trade Report**Wrenches—**

Agricultural... \$75 to \$75¢
Alligator or Crocodile... \$70 to \$70¢
Basier Pattern S Wrenches... \$70 to \$70¢
Drop Forged S... \$45 to \$45¢
Acme... \$40 to \$40¢
Alligator Pattern, 70%; Bull Dog... \$40 to \$40¢
Bemis & Call's:
Adjustable S, 40%; Adjustable S Pipe, 40%; Briggs Pattern, 40%; Combination Bright, 40%;
Steel Handle Nut... \$50¢
Combination Black... \$50¢
Merrick Pattern... \$50¢
Boardman's:
Coe's Genuine Knife Hdl. \$40 to \$40¢
Coe's Genuine Steel Hdl. \$40 to \$40¢
Coe's Genuine Key Model. \$40 to \$40¢
Coe's Genuine Hammer Handle... \$40 to \$40¢
Coe's "Mechanics"... \$40 to \$40¢
Donohue's Engineer... \$40 to \$40¢
Eagle... \$40 to \$40¢
Elgin Wrenches, 1/2 doz... \$40 to \$40¢
Elgin Retreading Attachment, only with one die, 1/2 doz... \$40 to \$40¢
Elgin Extra Dies, 1/2 doz... \$40 to \$40¢
Elgin Extra Jaws, 1/2 doz... \$40 to \$40¢
Elgin Monkey Wrench Pipe Jaws, 1/2 doz... \$40 to \$40¢
Gem Pocket... \$40 to \$40¢
Hercules... \$40 to \$40¢
W. & B. Machinist:
Case lots... \$50 to \$50¢
Less than case lots... \$40 to \$40¢
W. & B. Railroad Special:
Case lots... \$50 to \$50¢
Less than case lots... \$40 to \$40¢
Solid Handles, P. S. & W... \$50 to \$50¢
Sullivan... \$40 to \$40¢
Vulcan Chain... \$40 to \$40¢

Fruit Jar—

Triumph Fruit Jar Wrench, 5 gross lots, \$7.50; 1/2 doz. \$3.80

Wrought Goods—

Stables, Hooks, &c., list March 77, '92... \$7 1/2 to \$7 1/2 to \$4.10

Yokes, Ox, and Ox Bows—

Fort Madison's Farmers' & Freighters'... list not

Zinc—

Sheet... per 100 lb., \$3.50 to \$3.75</

